

A review of the catfish genus *Hara*, with the description of four new species (Siluriformes: Erethistidae)

Heok Hee NG¹ & Maurice KOTTELAT²

¹ Fish Division, Museum of Zoology, University of Michigan, 1109 Geddes Avenue, Ann Arbor, Michigan 48109-1079, USA.

Current address: Raffles Museum of Biodiversity Research, Department of Biological Sciences, National University of Singapore, 6 Science Drive 2, #03-01, Singapore 117546. Email: heokheen@umich.edu

² Case postale 57, Cornol, CH-2952, Switzerland. Email: mkottelat@dplanet.ch

A review of the catfish genus *Hara*, with the description of four new species (Siluriformes: Erethistidae). - Species of the erethistid catfish genus *Hara* are reviewed in this study. Eight species are recognized: *Hara filamentosa*, *H. hara*, *H. horai*, *H. jerdoni*, *H. longissima*, *H. mesembrina*, *H. minuscula*, and *H. spinulus*, of which the latter four are described as new herein. *Erethistes maesotensis* is a junior synonym of *Hara filamentosa*, and *H. saharasai* and *H. serrata* junior synonyms of *H. hara*. A neotype is designated for *H. filamentosa* Blyth, 1860 and a lectotype is designated for *Hara horai* Misra, 1976.

Keywords: Sisoroidea - Bangladesh - India - Myanmar - Thailand.

INTRODUCTION

The Erethistidae are a small family of sisoroid catfishes inhabiting hillstreams in the subhimalayan region and western Indochina. The erethistid catfish genus *Hara* consists of small to medium sized catfishes with a brown cryptic coloration and heavily tuberculate skin. Species of *Hara* are diagnosed from other members of the family in having an anteroventral flange on the ventral surface of the complex centrum and the parapophysis of the fifth vertebra with a vertical lamina (de Pinna, 1996). The genus has been recorded from the Ganges-Brahmaputra river drainages eastwards to the Salween River drainage in western Thailand (Hora, 1950; Kottelat, 1989; Ukkatawewat & Vidthayanon, 1998).

Recently, the authors obtained material from southern Thailand that considerably extends the southernmost extent of the distribution of *Hara*. Our attempts to identify this material prompted us to investigate the identities of specimens collected from India, Myanmar and Thailand. The following study presents the results of this investigation, which reviews the species of *Hara*. We report here eight species of *Hara*, of which four are described as new.

We received Thomson & Page's (2006) list of generic and species names in the families Erethistidae and Sisoridae after the present work was completed. A compila-

tion of such a nature would make sense as the completion of a revision of the various genera and species (but not before). Thomson & Page treat *Hara* as a junior synonym of *Erethistes*. In the discussion below, we mention the results of a phylogenetic analysis based on both morphological and molecular data that make it premature to formally synonymise these genera. This is discussed in greater detail in HHN's doctoral dissertation (Ng, 2006). Thomson & Page's list of species and synonymies of *Hara* are apparently compilations, and do not affect our conclusions below (based on our studies of a considerable number of specimens).

MATERIALS AND METHODS

Measurements were made point to point with dial callipers and data recorded to 0.1 mm. Counts and measurements were made on the left side of specimens whenever possible. Subunits of the head are presented as proportions of head length (HL). Head length itself and measurements of body parts are given as proportions of standard length (SL). Measurements and counts were made following Ng & Kottelat (1998) with the following addition: the length of the posterior process on coracoid is measured from the anterior edge of the coracoid where the process is situated to the posterior tip of the process.

Fin rays were counted under a binocular dissecting microscope using transmitted light. Vertebrae were counted from radiographs obtained with a Hewlett Packard Faxitron 43855B cabinet x-ray machine. Vertebral counts and terminology follow those of Roberts (1994). Material for this study is deposited in the following collections: Natural History Museum, London (BMNH), California Academy of Sciences, San Francisco (CAS), collection of the second author, Cornol (CMK), Muséum d'histoire naturelle Genève (MHNG), Naturhistoriska Riksmuseet, Stockholm (NRM), Museum of Zoology, University of Michigan, Ann Arbor (UMMZ), and the Zoological Reference Collection of the Raffles Museum of Biodiversity Research, Singapore (ZRC).

RESULTS

Hara filamentosa Blyth, 1860

Fig. 1

Hara filamentosa Blyth, 1860: 152 (type locality: Tenasserim)

Erethistes conta (non Hamilton): Vinciguerra, 1890: 250.

Erethistes maesotensis Kottelat, 1983: 71, Fig. 1 (type locality: Mae Nam Moei, 5 km west of Mae Sot, Thailand)

MATERIAL EXAMINED: CMK 11961 (2), 48.9-53.1 mm SL; CMK 14689 (9), 42.1-44.4 mm SL; Thailand: Tak province, Mae Nam Moei at Ban Wa Le. CMK 12175 (2), 44.6-47.0 mm SL; ZRC 42223 (1), 46.3 mm SL; Thailand: Tak province, stream at km 57 on road from Mae Sot to Wa Le (5 km before Wa Rei). ZRC 41269 (1), 44.3 mm SL; Thailand: Tak province, Mae Nam Moei at 16°17'47.1"N 98°42'44.9"E. MHNG 2150.5 (1 paratype of *Erethistes maesotensis*), 19.7 mm SL; Thailand: Tak province, Mae Nam Moei, 5 km W of Mae Sot. ZRC 50647 (1), 43.1 mm SL; Thailand: Tak province, Mae Nam Moei at Mae Sot (border with Myanmar), 16°41'13.2"N 98°30'54.0"E. CMK 14640 (11), 32.1-48.6 mm SL; MHNG 2680.076 (3), 40.2-48.1 mm SL; CMK 15102 (17), 20.6-30.1 mm SL; MHNG 2680.075 (5), 24.1-27.2 mm SL; Thailand: Tak province, Huai Mae Lamao, about 2 km N of road 105 on road from Ban Mae Lamao to Ban Mae Ramat. CMK 5529 (1), 48.3 mm SL; Thailand: Tak province, Huai Mae Lamao at Ban Mae Lamao. UMMZ 197583 (1), 47.4 mm SL; Thailand: Tak province, Mae

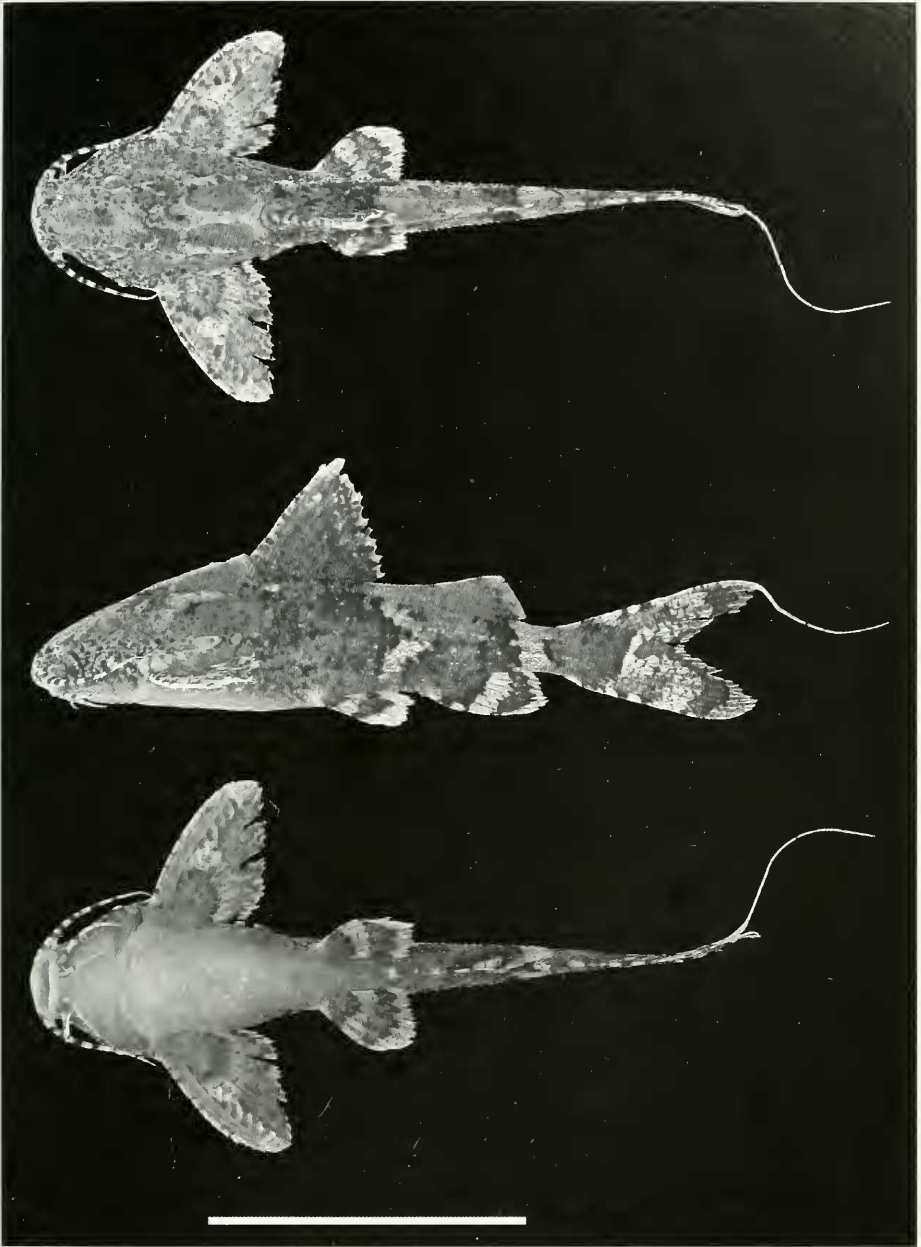


FIG. 1

Hara filamentosa, neotype, MHNG 2687.038, 43.7 mm SL; Myanmar: Megathat Chaung. Scale bar: 25 mm.

Lamao, tributary of Salween River. CMK 14769 (1), 55.2 mm SL; Thailand: Mae Hong Son province, Huai Hai, about 5 km from Mae Hong Son to Pai road, on road turning off north at km 44. CMK 16186 (5), 41.4-52.4 mm SL; CMK 17951 (2), 44.8-62.7 mm SL; Thailand: Mae Hong Song province, Salween River at Mae Sam Leap. CMK 16198 (1), 45.3 mm SL; Thailand: Mae Hong Son province, Nam Mae Kong Ka, 4-8 km upstream of confluence with Salween River. CMK 16227 (1), 46.9 mm SL; Thailand: Mae Hong Son province, Salween River about 1 km upstream of Ban Mae Sam Leap. BMNH 1893.2.16.12-14 (3), 49.4-59.1 mm SL. – Myanmar: Meetan (=Mitan Chaung, a rivulet flowing S from the summit of Mulayet Taung, 16°11'N 98°32'E, in the Salween basin), MHNG 2687.038, neotype, 43.7 mm SL; CMK 17786 (4), 46.8-59.7 mm SL; CMK 17951 (2), 45.1-61.2 mm SL; Myanmar: Kayin state, Ataran River drainage, stream "Chon Son" between Kyondaw and Phadaw, about 20 km NW of Payathouzu (at border with Thailand), 15°25'N 98°15'E. UMMZ 243692 (6), 46.4-50.0 mm SL; Myanmar: from aquarium trade. UMMZ 245962 (1), 53.7 mm SL; Myanmar: Bago division, Pyu township, Pyu stream (tributary of Sittang River) ca. 229 km from Yangon, 18°29'N 96°26'E. UMMZ 245964 (9), 56.7-67.1 mm SL; Myanmar: Kayin state, hillstreams in Ataran River drainage in the vicinity of Payathonzu.

DIAGNOSIS: *Hara filamentosa* can be distinguished from congeners (except *H. mesembrina* and *H. longissima*) in sometimes having (vs. always lacking) a filamentous extension to the first principal ray of the upper caudal-fin lobe; it is also distinguished from all congeners except *H. hara* and *H. longissima* in having a short posterior process on coracoid (reaching to midway of distance between bases of pectoral spine and first pelvic-fin ray vs. two thirds or beyond; length 19.9-22.8% SL vs. 23.5-38.3). It differs from *H. longissima* in having a shorter (length 14.9-17.8% SL vs. 18.8-21.3) and deeper (depth 6.1-7.2% SL vs. 5.0-6.1) caudal peduncle (depth 2.1-2.9 times in its length for *H. filamentosa* vs. 3.1-3.9 times in *H. longissima*) and deeper body (depth 13.9-19.2% SL vs. 12.5-14.5). *Hara filamentosa* can be further distinguished from *H. hara* in having a longer adipose-fin base (15.7-21.7% SL vs. 11.8-15.6), deeper caudal peduncle (depth 6.1-7.2% SL vs. 5.0-5.8) and lacking (vs. presence) of serrations on the anterior edge of the dorsal spine, from *H. horai* in having a deeper caudal peduncle (depth 6.1-7.2% SL vs. 5.2-6.2) and a shorter adipose-fin base (length 15.7-21.7% SL vs. 10.0-13.7) and head (length 26.5-29.1% SL vs. 30.3-34.2), from *H. jerdoni* in having a shorter pectoral spine (length 23.3-29.9% SL vs. 42.2-51.7), more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5), more vertebrae (31-34 vs. 27-29), the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate and a deeply forked (vs. emarginate) caudal fin. It differs from *H. mesembrina* in having a shorter caudal peduncle (length 14.9-17.8% SL vs. 17.2-18.9), from *H. minuscula* in having more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5) and the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate, and from *H. spinulus* in having a longer dorsal spine (length 20.4-27.6% SL vs. 14.7-19.8), adipose-fin base (length 15.7-21.7% SL vs. 12.9-16.1) and caudal peduncle (length 14.9-17.8 % SL vs. 11.8-15.0).

DESCRIPTION: Morphometric data in Table 1. Head and body moderately compressed. Dorsal profile curved from tip of snout to level of nares, then evenly sloping to origin of dorsal fin; evenly sloping ventrally to origin of adipose fin and gently concave from origin of adipose fin to end of caudal peduncle. Ventral profile flat to pelvic-fin base; sloping gently dorsally to end of anal-fin base and gently concave from end of anal-fin base to end of caudal peduncle. Anus and urogenital openings

TABLE 1. Morphometric data for *Hara filamentosa* (n=25: 43.7-67.1 mm SL).

| | Range | Mean±SD |
|---|-----------|------------|
| %SL | | |
| Predorsal length | 42.1-46.7 | 44.3±1.44 |
| Preanal length | 69.1-72.9 | 70.4±1.14 |
| Prepelvic length | 49.0-52.3 | 51.0±1.04 |
| Prepectoral length | 21.3-27.8 | 24.0±1.66 |
| Length of dorsal fin base | 17.2-20.7 | 18.9±1.16 |
| Dorsal spine length | 20.4-27.6 | 23.6±2.48 |
| Anal fin length | 13.0-17.2 | 14.8±1.10 |
| Pelvic fin length | 16.0-19.6 | 17.2±1.20 |
| Pectoral fin length | 25.6-32.4 | 28.8±2.16 |
| Pectoral spine length | 23.3-29.9 | 27.0±1.99 |
| Caudal fin length | 20.9-30.3 | 26.7±2.80 |
| Length of adipose fin base | 15.7-21.7 | 18.7±1.99 |
| Dorsal to adipose distance | 5.1-11.0 | 7.2±1.96 |
| Post-adipose distance | 14.1-18.3 | 16.5±1.50 |
| Caudal peduncle length | 14.9-17.8 | 16.7±0.88 |
| Caudal peduncle depth | 6.1-7.2 | 6.8±0.37 |
| Body depth at anus | 13.9-19.2 | 16.9±1.65 |
| Head length | 26.5-29.1 | 28.0±0.91 |
| Head width | 21.0-27.0 | 24.7±1.75 |
| Head depth | 19.1-24.3 | 21.5±1.54 |
| Length of posterior process on coracoid | 19.9-22.8 | 21.3±1.04 |
| %HL | | |
| Snout length | 50.0-60.7 | 54.9±3.60 |
| Interorbital distance | 32.2-41.4 | 37.3±3.04 |
| Eye diameter | 12.5-15.5 | 13.7±1.21 |
| Nasal barbel length | 12.6-22.1 | 17.0±3.59 |
| Maxillary barbel length | 57.5-94.4 | 85.0±10.66 |
| Inner mandibular barbel length | 31.0-45.4 | 38.1±4.47 |
| Outer mandibular barbel length | 37.4-61.3 | 52.5±8.00 |

located at vertical through posterior three quarters of adpressed pelvic fin. Skin tuberculate, tubercles distributed evenly throughout head and body. Lateral line complete and midlateral. Vertebrae 14+17=31 (1), 14+18=32 (2), 15+17=32 (2), 14+19=33 (1), 15+18=33 (5), 16+17=33 (4), 15+19=34 (2) or 16+18=34 (7).

Snout narrow; profile dorsally rounded when viewed laterally and acutely triangular when viewed from above. Snout with pronounced steepening of curvature anteriorly at level of posterior nares when viewed laterally. Anterior and posterior nares large and separated by flap of skin comprising base of nasal barbel. Gill openings narrow, extending from immediately ventral to posttemporal to immediately lateral to point immediately ventral to base of pectoral spine. Bony elements of dorsal surface of head covered with thin, tuberculate skin and very prominent. Supraoccipital spine not reaching anterior nuchal plate. Weberian lamina well developed, approximately same length as supraoccipital spine and extending parallel to either side of spine. Eye ovoid, horizontal axis longest; located entirely in dorsal half of head, with faint dorsal ridge on frontal bone dorsal to eye. Orbit with free margin.

Barbels in four pairs. Maxillary barbel long and slender, extending to middle of pectoral-spine base. Nasal barbel short, subtended by flap of skin at base and extending to midway between posterior edge of posterior nares and anterior margin of orbit. Inner mandibular-barbel origin close to midline, extending to middle of distance between its base and that of pectoral spine. Outer mandibular barbel originating posterolateral of inner mandibular barbel, extending to about three quarters of distance between its base and that of pectoral spine.

Mouth inferior, premaxillary tooth band not exposed when mouth is closed. Upper lip with indistinct plicae. Oral teeth small and villiform, in irregular rows on all tooth-bearing surfaces. Premaxillary teeth in single crescentic band across midline. Palate edentulous. Dentary teeth in two narrow crescentic bands separated at midline.

Dorsal fin located above anterior third of body, with I,5,i (25) rays; dorso-posterior fin margin straight. Dorsal spine moderately long and gently curved; with smooth anterior margin and posterior margin with 4-7 serrae. Adipose fin with anterior margin straight and posterior margin angular. Caudal fin strongly forked, with i,7,7,i (1), i,7,8,i (23) or i,8,7,i (1) principal rays; upper lobe slightly longer than lower. First principal ray of upper caudal-fin lobe produced into a filament extending posteriorly for length of upper caudal lobe proper. Procurrent rays symmetrical and extending only slightly anterior to fin base. Anal-fin base approximately in line with adipose-fin base. Anal fin with convex margin anteriorly and straight margin posteriorly, with iii,6,i (3), iv,6 (2) iv,6,i (8), iii,7 (2), iii,7,i (5), v,6 (1), iv,7 (1) or iv,7,i (3) rays. Pelvic-fin origin anterior to vertical through posterior end of dorsal-fin base. Pelvic fin with pointed tip and straight posterior margin, with i,5 (25) rays; tip of adpressed fin just reaching anal-fin origin. Pectoral fin with I,5,i (3) or I,6,i (22) rays; fin margin gently convex posteriorly; anterior spine margin with 14-23 small distally directed serrations, posterior margin with 9-13 large medially directed serrations. Coracoid with well developed posterior processes, extending to midway between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Colour: Head and body dark chestnut brown to light chocolate brown, with a mottling caused by numerous smaller, irregular darker brown patches. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first chevron-shaped and located between dorsal- and adipose-fin bases, second thicker than first and located on caudal peduncle. Dorsal fin dark mottled brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes. Adipose fin brown as in body, with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Two small light brown patches present at bases of caudal-fin lobes in some individuals. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION. *Hara filamentosa* is known from the Ataran, Salween and Sittang river drainages (Fig. 2). In the Salween, it has been collected in the Salween proper and the Mae Nam Moei, in Tak and Mae Hong Son Provinces of Thailand.

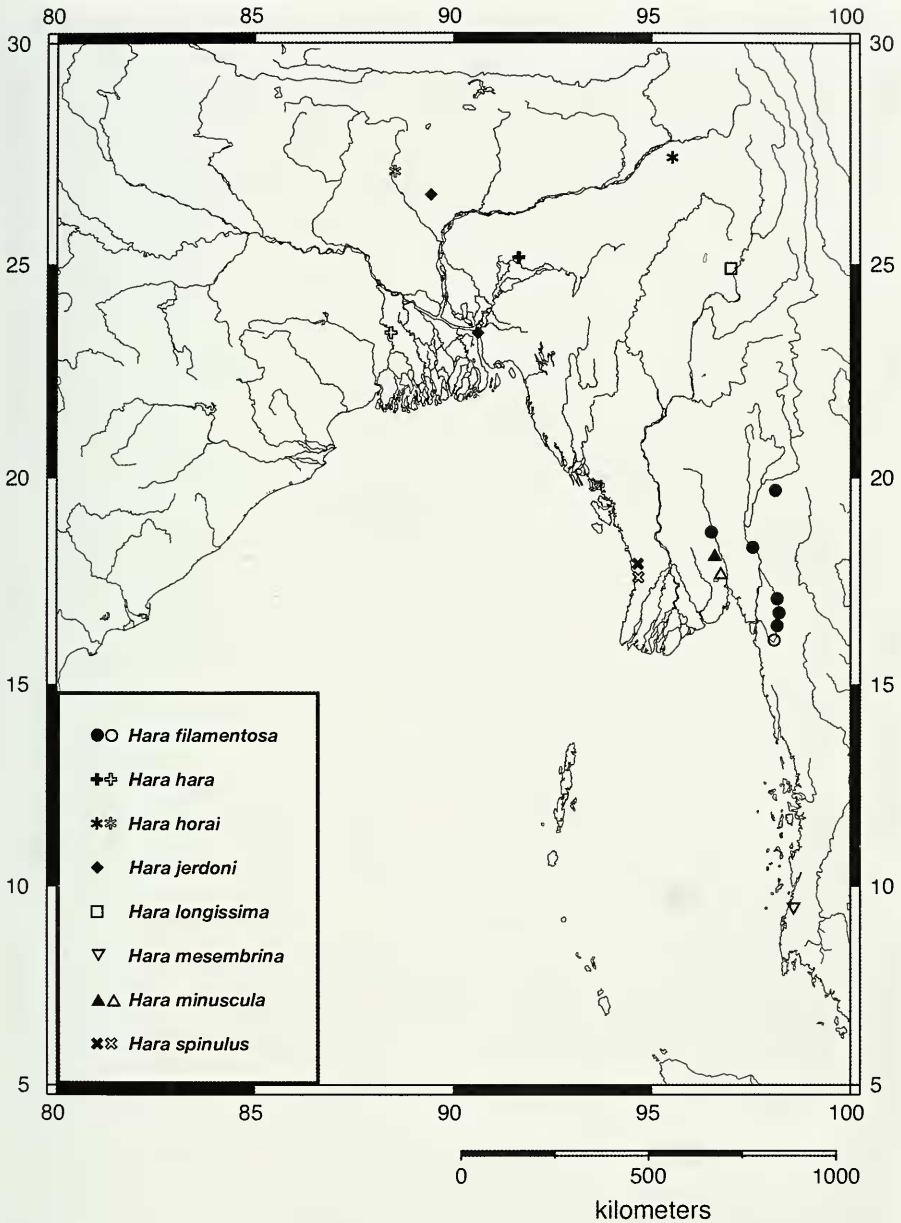


FIG. 2

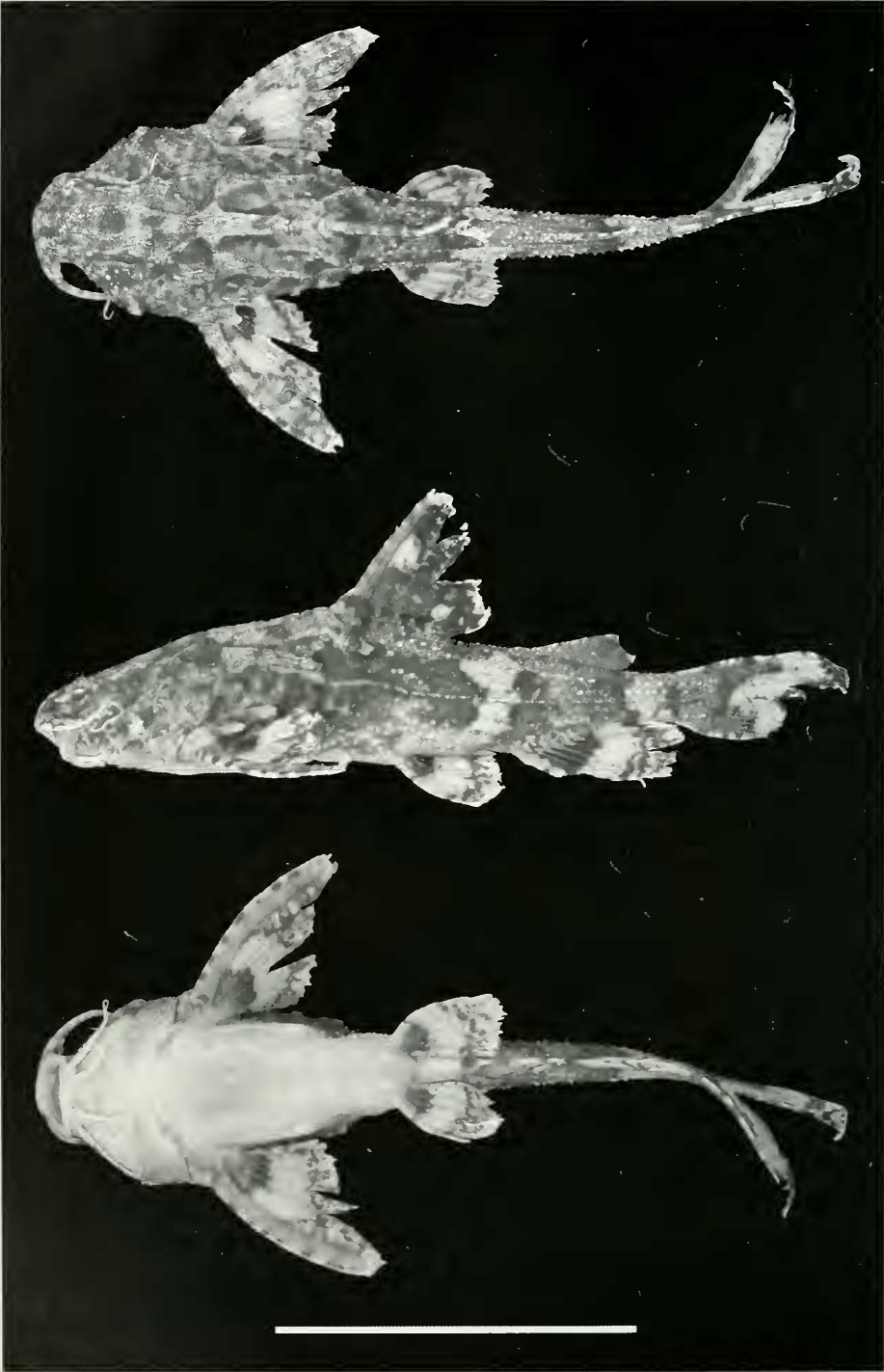
Map showing collecting localities of *Hara* examined. Outlined symbols are type localities.

Hara hara (Hamilton 1822)

Fig. 3

Pimelodus hara Hamilton, 1822: 190 (type locality: Nathpur, India)

Pimelodus asperus M'Clelland, 1844: 404, pl. 24 fig. 2 (type locality: Hooghly River S of Ranaghat)



Hara saharasai Datta Munshi & Srivastava, 1988: 265, fig. 5 (type locality: Kosi Belt, northern Bihar, India)

Hara serratus Vishwanath & Kosygin, 2000: 143, figs 2-5 (type locality: Jiri River at Jiribam, Manipur, India)

MATERIAL EXAMINED: UMMZ 244697 (neotype), 47.2 mm SL; India: W Bengal, Hooghly River S of Ranaghat. UMMZ 208748 (44), 33.0-50.0 mm SL; Bangladesh: Gowain River at Gowainghat.

DIAGNOSIS: *Hara hara* can be distinguished from congeners in possessing (vs. lacking) serrations on the anterior edge of the pectoral spine. It further differs from *H. filamentosa*, *H. mesembrina* and *H. longissima* in always lacking (vs. sometimes having) a filamentous extension to the first principal ray of the upper caudal-fin lobe; it is also distinguished from all congeners except *H. filamentosa* and *H. longissima* in having a short posterior process on coracoid (reaching to midway of distance between bases of pectoral spine and first pelvic-fin ray vs. two thirds or beyond; length 19.9-24.8% SL vs. 23.5-38.3). *Hara hara* further differs from *H. filamentosa* in having a shorter adipose-fin base (11.8-15.6% SL vs. 15.7-21.7) and slenderer caudal peduncle (depth 5.0-5.8% SL vs. 6.1-7.2), from *H. horai* in having a longer caudal fin (25.8-28.0% SL vs. 20.5-23.5), slenderer body (11.5-14.3% SL vs. 15.1-17.9) and a shorter head (length 27.2-30.9% SL vs. 30.3-34.2), from *H. jerdoni* in having a shorter pectoral spine (length 26.9-33.3% SL vs. 42.2-51.7), more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5), more vertebrae (31-34 vs. 27-29), the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate, and a deeply forked (vs. emarginate) caudal fin. It further differs from *H. mesembrina* in having a slenderer caudal peduncle (depth 5.0-5.8% SL vs. 6.0-7.4), from *H. minuscula* in having a narrower head (width 22.4-24.3% SL vs. 24.5-27.2), more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5) and the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate, and from *H. spinulus* in having a longer dorsal spine (22.7-27.4% SL vs. 14.7-19.8), narrower head (width 22.4-24.3% SL vs. 25.9-30.0) and slenderer caudal peduncle (depth 5.0-5.8% SL vs. 6.7-8.5).

DESCRIPTION: Morphometric data in Table 2. Exactly as in *Hara filamentosa*, except for the following. Vertebrae 14+18=32 (7), 15+17=32 (4), 14+19=33 (1), 15+18=33 (9) or 15+19=34 (3). Dorsal fin with I,5,i (24) rays. Dorsal spine moderately long and gently curved; with serrated anterior margin and posterior margin with 8-13 serrae. Caudal fin with i,7,6,i (24) principal rays. First principal ray of upper caudal-fin lobe not produced into a filament. Anal fin with iv,6,i (24) rays. Pelvic fin with i,5 (24) rays. Pectoral fin with I,6,i (24) rays; anterior spine margin with 17-24 small distally directed serrations, posterior margin with 12-17 large medially directed serrations. Coracoid with well developed posterior processes, extending to midway between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Colour: Head and body chestnut brown or light brown, with a mottling caused by numerous smaller, irregular darker brown patches. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first chevron-shaped and located between dorsal- and adipose-fin bases, second thicker than first and located

FIG. 3

Hara hara, neotype, UMMZ 244697, 47.2 mm SL; India: Hooghly River at Ranaghat. Scale bar: 25 mm.

TABLE 2. Morphometric data for *Hara hara* (n=24: 33.0-50.0 mm SL).

| | Range | Mean±SD |
|---|------------|-----------|
| %SL | | |
| Predorsal length | 44.0-45.5 | 44.6±0.64 |
| Preanal length | 66.9-70.9 | 68.7±1.54 |
| Prepelvic length | 47.6-53.6 | 51.1±2.28 |
| Prepectoral length | 21.2-27.3 | 24.4±2.22 |
| Length of dorsal fin base | 16.7-21.0 | 18.6±1.60 |
| Dorsal spine length | 22.7-27.4 | 24.5±1.88 |
| Anal fin length | 14.6-16.8 | 15.6±0.82 |
| Pelvic fin length | 15.8-18.2 | 16.8±0.91 |
| Pectoral fin length | 30.0-36.2 | 32.5±2.40 |
| Pectoral spine length | 26.9-33.3 | 30.0±2.32 |
| Caudal fin length | 25.8-28.0 | 27.0±1.01 |
| Length of adipose fin base | 11.8-15.6 | 14.0±1.46 |
| Dorsal to adipose distance | 10.8-12.7 | 12.0±0.71 |
| Post-adipose distance | 15.7-18.6 | 17.2±1.27 |
| Caudal peduncle length | 14.6-19.4 | 17.7±1.85 |
| Caudal peduncle depth | 5.0-5.8 | 5.4±0.34 |
| Body depth at anus | 11.5-14.3 | 12.8±1.28 |
| Head length | 27.2-30.9 | 29.6±1.41 |
| Head width | 22.4-24.3 | 23.5±0.91 |
| Head depth | 18.6-20.1 | 19.3±0.61 |
| Length of posterior process on coracoid | 19.9-24.8 | 22.0±1.79 |
| %HL | | |
| Snout length | 50.0-54.7 | 51.8±1.87 |
| Interorbital distance | 31.5-38.0 | 35.4±2.53 |
| Eye diameter | 9.4-10.9 | 10.1±0.65 |
| Nasal barbel length | 14.8-21.9 | 18.0±3.07 |
| Maxillary barbel length | 80.8-108.2 | 93.4±9.78 |
| Inner mandibular barbel length | 34.2-49.6 | 43.6±6.13 |
| Outer mandibular barbel length | 52.1-67.2 | 60.8±6.13 |

on caudal peduncle. Dorsal fin dark mottled brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes. Adipose fin brown as in body, with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Two small light brown patches present at bases of caudal-fin lobes in some individuals. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION: *Hara hara* is known from the Brahmaputra and Ganges river drainages (Fig. 2).

Hara horai Misra, 1976

Fig. 4

Hara horai Misra, 1976: 245, Pl. 9 figs 1-3 (type locality: Terai and Duars, northern Bengal, India)

MATERIAL EXAMINED: ZSI FF955 (lectotype), 58.8 mm SL; India: West Bengal, Terai and Duars. UMMZ 245633 (2), 56.2-73.1 mm SL; ZRC 50578 (2), 41.8-62.7 mm SL; India: Assam,

Tinsukia, Dibru River at Guijan. ZRC 50576 (3), 44.8-50.4 mm SL; India: Assam, Guijan. ZRC 38914 (2), 83.4-85.4 mm SL; ZRC 41364 (1), 77.8 mm SL; India: Assam, from aquarium trade.

DIAGNOSIS: *Hara horai* can be distinguished from *H. filamentosa* in always lacking (vs. sometimes having) a filamentous extension to the first principal ray of the upper caudal-fin lobe and having a slenderer caudal peduncle (depth 5.2-6.2% SL vs. 6.1-7.2), shorter adipose-fin base (length 10.0-13.7% SL vs. 15.7-21.7), longer head (length 30.3-34.2% SL vs. 26.5-29.1) and posterior process on coracoid (reaching to two-thirds distance between bases of pectoral spine and first pelvic-fin ray vs. midway; length 23.5-26.2% SL vs. 19.9-22.8), from *H. hara* in having a shorter caudal fin (20.5-23.5% SL vs. 25.8-28.0), deeper body (15.1-17.9% SL vs. 11.5-14.3), and a longer head (length 30.3-34.2% SL vs. 27.2-30.9), and from *H. jerdoni* in having a shorter pectoral spine (length 28.0-33.4% SL vs. 42.2-51.7), more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5), more vertebrae (31-34 vs. 27-29), the supra-occipital spine not reaching (vs. reaching) the anterior nuchal plate and a deeply forked (vs. emarginate) caudal fin. It differs from *H. longissima* in always lacking (vs. sometimes having) a filamentous extension to the first principal ray of the upper caudal-fin lobe and having a shorter adipose-fin base (length 10.0-13.7% SL vs. 13.3-16.5) and caudal peduncle (length 15.5-17.9% SL vs. 18.8-21.3), a deeper body (depth 15.1-17.9% SL vs. 12.5-14.5), a longer head (length 30.3-34.2% SL vs. 26.0-29.1) and a smaller eye (diameter 8.0-9.8% HL vs. 11.3-13.8), from *H. mesembrina* in always lacking (vs. sometimes having) a filamentous extension to the first principal ray of the upper caudal-fin lobe and having a shorter adipose-fin base (length 10.0-13.7% SL vs. 13.5-17.0), slenderer caudal peduncle (depth 5.2-6.2% SL vs. 6.0-7.4), longer head (length 30.3-34.2% SL vs. 22.1-27.3) and smaller eye (diameter 8.0-9.8% HL vs. 13.1-17.9), from *H. minuscula* in having a longer head (30.3-34.2% SL vs. 24.8-28.4), shorter posterior process on coracoid (reaching to two thirds of distance between bases of pectoral spine and first pelvic-fin ray vs. three quarters; length 23.5-26.2% SL vs. 29.5-32.9), more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5) and the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate, and from *H. spinulus* in having a longer dorsal spine (length 21.0-28.4% SL vs. 14.7-19.8), shorter adipose-fin base (length 10.0-13.7% SL vs. 12.9-16.1), longer (length 15.5-17.9% SL vs. 11.8-15.0) and slenderer (depth 5.2-6.2% SL vs. 6.7-8.5) caudal peduncle, longer head (length 30.3-34.2% SL vs. 26.9-28.9) and smaller eye (diameter 8.0-9.8% SL vs. 11.2-14.4).

DESCRIPTION: Morphometric data in Table 3. Exactly as in *Hara filamentosa*, except for the following. Vertebrae 14+17=31 (1), 15+16=31 (1), 14+18=32 (6), 15+17=32 (1) or 14+19=33 (1). Dorsal fin with I,5,i (10) rays. Dorsal spine moderately long and gently curved; with smooth anterior margin and posterior margin with 8-11 serrae. Caudal fin with i,7,6,i (10) principal rays. First principal ray of upper caudal-fin lobe not produced into a filament. Anal fin with iv,6,i (10) rays. Pelvic fin with i,5 (10) rays. Pectoral fin with I,6,i (10) rays; anterior spine margin with 19-25 small distally directed serrations, posterior margin with 9-17 large medially directed serrations. Coracoid with well developed posterior processes, extending to two-thirds distance between base of posteriormost pectoral-fin ray and pelvic-fin origin.



TABLE 3. Morphometric data for *Hara horai* (n=10: 41.8-85.4 mm SL).

| | Range | Mean±SD |
|---|-----------|-----------|
| %SL | | |
| Predorsal length | 42.1-49.2 | 46.4±2.35 |
| Preanal length | 68.6-70.9 | 69.9±0.86 |
| Prepelvic length | 50.7-53.2 | 52.0±0.88 |
| Prepectoral length | 23.0-29.4 | 25.8±2.22 |
| Length of dorsal fin base | 19.1-23.3 | 21.0±1.82 |
| Dorsal spine length | 21.0-28.4 | 24.0±2.60 |
| Anal fin length | 11.2-17.7 | 14.6±2.25 |
| Pelvic fin length | 14.8-18.7 | 17.2±1.73 |
| Pectoral fin length | 30.9-36.5 | 32.6±3.01 |
| Pectoral spine length | 28.0-33.4 | 30.4±2.07 |
| Caudal fin length | 20.5-23.5 | 23.5±1.72 |
| Length of adipose fin base | 10.0-13.7 | 12.2±1.40 |
| Dorsal to adipose distance | 7.7-12.5 | 10.8±2.00 |
| Post-adipose distance | 14.0-16.7 | 15.6±1.08 |
| Caudal peduncle length | 15.5-17.9 | 16.6±0.89 |
| Caudal peduncle depth | 5.2-6.2 | 5.7±0.39 |
| Body depth at anus | 15.1-17.9 | 16.7±1.01 |
| Head length | 30.3-34.2 | 31.6±1.61 |
| Head width | 23.1-29.6 | 27.3±2.27 |
| Head depth | 19.6-21.9 | 21.1±0.83 |
| Length of posterior process on coracoid | 23.5-26.2 | 24.7±1.63 |
| %HL | | |
| Snout length | 48.0-53.3 | 50.0±2.06 |
| Interorbital distance | 30.8-36.5 | 33.7±2.10 |
| Eye diameter | 8.0-9.8 | 8.8±0.82 |
| Nasal barbel length | 15.8-26.0 | 21.2±4.90 |
| Maxillary barbel length | 71.5-84.6 | 76.2±5.08 |
| Inner mandibular barbel length | 32.4-40.0 | 36.9±3.37 |
| Outer mandibular barbel length | 40.4-52.6 | 45.9±4.48 |

Colour: Head and body dark chestnut dark chocolate brown, without mottling. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first chevron-shaped and located between dorsal- and adipose-fin bases, second thicker than first and located on caudal peduncle. Dorsal fin dark brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes. Adipose fin brown as in body, with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION: *Hara horai* is known from the Brahmaputra River drainage (Fig. 2).

FIG. 4

Hara horai, ZRC 38914, 83.4 mm SL; India: Assam. Scale bar 50 mm.

Hara jerdoni Day, 1870

Fig. 5

Hara jerdoni Day, 1870: 39, Pl. 4 (type locality: Sylhet district, Bangladesh)

MATERIAL EXAMINED: UMMZ 208401 (12), 15.6–20.6 mm SL; Bangladesh: Dakatia River at Chandpur, UMMZ 244581 (1), 19.2 mm SL; India: West Bengal, Dolong River (a tributary of the Mansai River) in the vicinity of Shildanga, 26°23'13"N 89°14'31"E.

DIAGNOSIS: *Hara jerdoni* can be distinguished from all congeners in having a longer pectoral spine (length 42.2–51.7% SL vs. 23.3–34.7), fewer vertebrae (27–29 vs. 30–35) an emarginate (vs. deeply forked) caudal fin and a longer posterior process on coracoid (reaching to four fifths of distance between bases of pectoral spine and first pelvic-fin ray vs. three quarters or less; length 34.4–38.3% SL vs. 19.9–32.9). It further differs from all congeners except *H. minuscula* in having fewer soft pectoral-fin rays (total number of soft fin rays modally 5 vs. 6–7) and the supraoccipital spine reaching (vs. not reaching) the anterior nuchal plate. *Hara jerdoni* is also the smallest species of *Hara*, not reaching ca. 25 mm SL in maximum size (vs. ca. 30 mm SL in *H. minuscula* and 60 mm SL in other congeners; Table 4).

DESCRIPTION: Morphometric data in Table 5. Exactly as in *Hara filamentosa*, except for the following. Vertebrae 14+13=27 (1), 14+14=28 (3), 15+13=28 (6) or 15+14=29 (2). Supraoccipital spine reaching anterior nuchal plate. Dorsal fin with I,5,i (12) rays. Dorsal spine moderately long and gently curved; with smooth anterior margin and posterior margin with 4–5 serrae. Caudal fin emarginate, with i,5,5,i (12) principal rays; without filamentous extension to first principal ray of upper lobe. Anal fin with iii,5,i (11) or iii,6,i (1) rays. Pelvic fin with i,5 (12) rays. Pectoral fin with I,4,i (12) rays; anterior spine margin with 18–25 small distally directed serrations, posterior margin with 10–12 large medially directed serrations. Coracoid with well developed posterior process, extending to four-fifths distance between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Colour: Head and body dark chestnut brown to light chocolate brown, with a mottling caused by numerous smaller, irregular darker brown patches. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first chevron-shaped and located between dorsal- and adipose-fin bases, second thicker than first and located on caudal peduncle. Dorsal fin dark mottled brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes. Adipose fin brown as in body, with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Two small light brown patches present at bases of caudal-fin lobes in some individuals. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION: *Hara jerdoni* is known from the Brahmaputra River drainage (Fig. 2), and has also been recorded from the Ganges River drainage (Husain & Tilak, 1978).

FIG. 5

Hara jerdoni, UMMZ 208401, 19.2 mm SL; Bangladesh: Dakatia River. Scale bar: 10 mm.

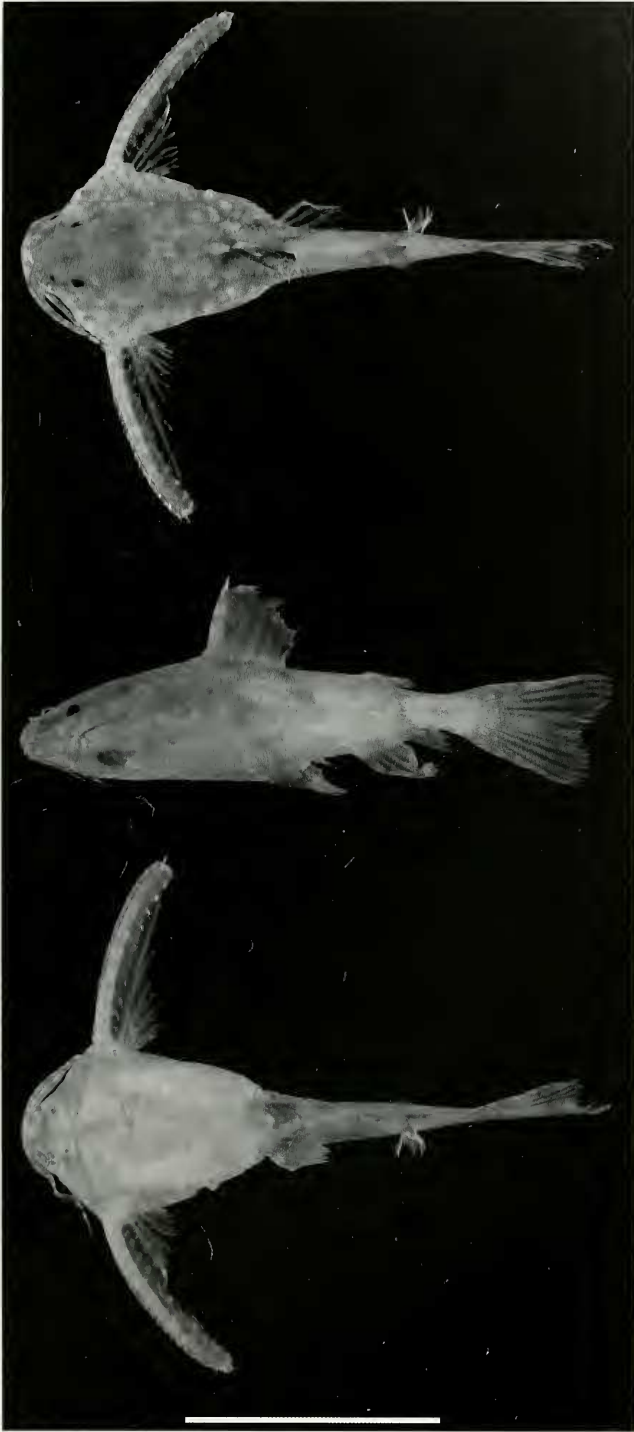


TABLE 4. Maximum known sizes of *Hara* species

| Species | Maximum size (SL) |
|-------------------------|-------------------|
| <i>Hara filamentosa</i> | 67 mm |
| <i>Hara hara</i> | 50 mm |
| <i>Hara horai</i> | 85 mm |
| <i>Hara jerdoni</i> | 21 mm |
| <i>Hara longissima</i> | 55 mm |
| <i>Hara mesembrina</i> | 55 mm |
| <i>Hara minuscula</i> | 30 mm |
| <i>Hara spinulus</i> | 50 mm |

TABLE 5. Morphometric data for *Hara jerdoni* (n=11: 15.6-20.6 mm SL).

| | Range | Mean±SD |
|---|------------|------------|
| %SL | | |
| Predorsal length | 38.5-43.3 | 41.5±2.62 |
| Preanal length | 67.3-70.3 | 68.9±1.51 |
| Prepelvic length | 53.1-54.3 | 53.8±0.64 |
| Prepectoral length | 18.0-19.7 | 18.6±0.93 |
| Length of dorsal fin base | 19.1-19.7 | 19.4±0.31 |
| Dorsal spine length | 19.1-21.4 | 19.9±1.30 |
| Anal fin length | 14.4-16.3 | 15.4±0.96 |
| Pelvic fin length | 14.4-15.5 | 14.8±0.59 |
| Pectoral fin length | 46.6-46.9 | 46.8±0.21 |
| Pectoral spine length | 42.2-51.7 | 48.0±4.69 |
| Caudal fin length | 24.5-27.9 | 26.6±1.81 |
| Length of adipose fin base | 9.9-12.9 | 11.0±1.68 |
| Dorsal to adipose distance | 10.8-12.0 | 11.4±0.60 |
| Post-adipose distance | 15.5-18.2 | 16.5±1.46 |
| Caudal peduncle length | 14.9-15.4 | 15.1±0.25 |
| Caudal peduncle depth | 4.7-5.3 | 5.1±0.32 |
| Body depth at anus | 15.5-16.1 | 15.8±0.31 |
| Head length | 27.6-29.4 | 28.6±0.93 |
| Head width | 25.5-31.3 | 28.2±2.92 |
| Head depth | 22.6-23.7 | 23.2±0.57 |
| Length of posterior process on coracoid | 34.4-38.3 | 36.4±1.40 |
| %HL | | |
| Snout length | 41.6-47.2 | 44.2±2.81 |
| Interorbital distance | 37.7-41.6 | 39.9±2.00 |
| Eye diameter | 12.3-17.0 | 14.2±2.48 |
| Nasal barbel length | 16.7-28.1 | 21.2±6.05 |
| Maxillary barbel length | 52.8-105.3 | 77.7±26.35 |
| Inner mandibular barbel length | 37.7-51.7 | 46.2±7.45 |
| Outer mandibular barbel length | 47.2-84.2 | 66.0±18.51 |

***Hara longissima* sp. nov.**

Fig. 6

HOLOTYPE: UMMZ 245902, 51.2 mm SL; Myanmar: Kachin state, Myitkyina district, hillstreams approximately 2 hours by foot on road from Mogaung to Kamaing; Tin Win & Kyaw Zin, 1 August 2004.

PARATYPES: UMMZ 245945 (10), 49.0-55.3 mm SL; data as for holotype.

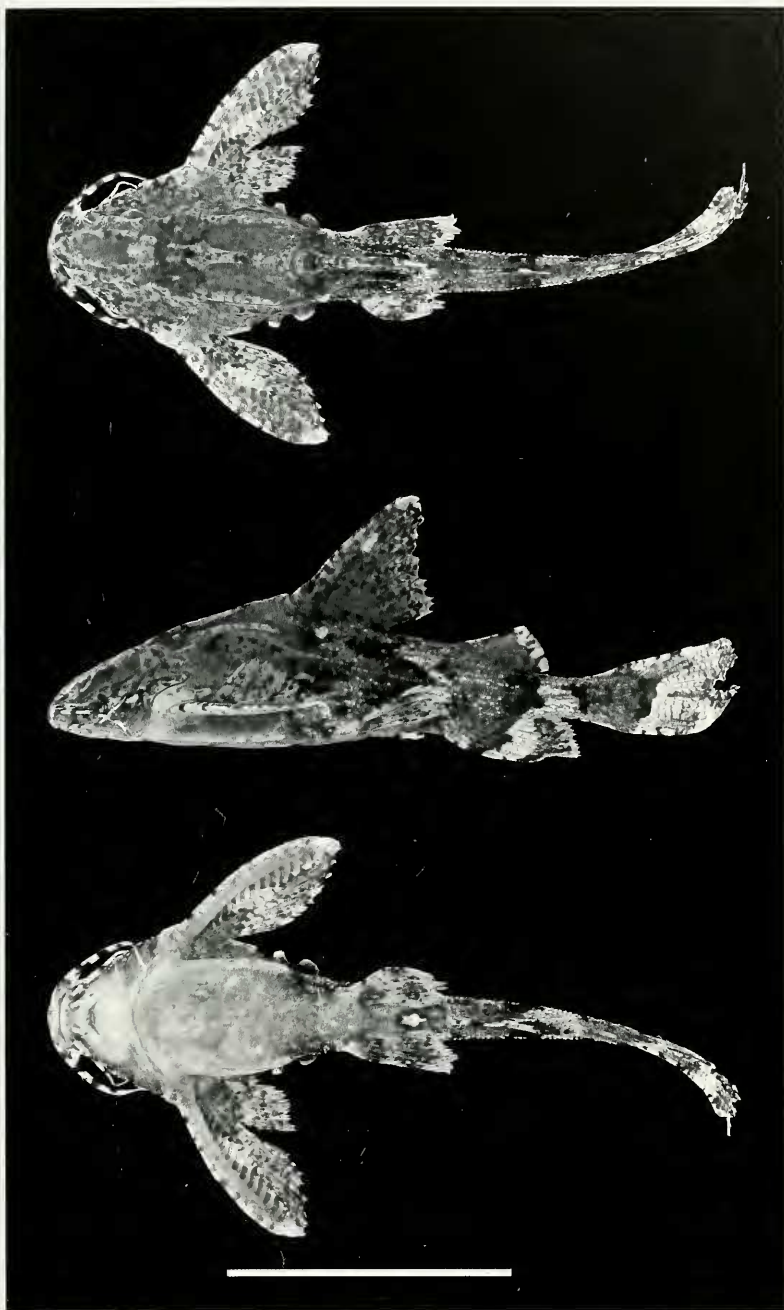


FIG. 6

Hara longissima, holotype, UMMZ 245902, 51.2 mm SL; Myanmar: hillstreams approximately 2 hours by foot on road from Mogaung to Kamaing. Scale bar: 25 mm.

DIAGNOSIS: *Hara longissima* can be distinguished from all congeners in having a longer caudal peduncle (18.8-21.3% SL vs. 11.7-19.4) and from congeners except *H. filamentosa* and *H. mesembrina* in having (vs. lacking) a filamentous extension of the first principal ray of the upper caudal-fin lobe. It further differs from *H. filamentosa* in having a slenderer (depth 5.0-6.1% SL vs. 6.1-7.2) caudal peduncle and body (depth 12.5-14.5% SL vs. 13.9-19.2), from *H. hara* in lacking (vs. having) serrations on the anterior edge of the dorsal spine, and from *H. horai* in having a longer adipose-fin base (length 13.3-16.5% SL vs. 10.0-13.7), a slenderer body (depth 12.5-14.5% SL vs. 15.1-17.9), a shorter head (length 26.0-29.1% SL vs. 30.3-34.2) and a larger eye (diameter 11.3-13.8% HL vs. 8.0-9.8). *Hara longissima* can be further distinguished from both *H. jerdoni* and *H. minuscula* in having a shorter posterior process on coracoid (reaching to midway of distance between bases of pectoral spine and first pelvic-fin ray vs. at least three quarters; its length 20.7-23.9% SL vs. 29.5-38.3), more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5) and vertebrae (33-35 vs. 27-32), and the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate, and from *H. jerdoni* in having a shorter pectoral spine (length 25.9-31.8% SL vs. 42.2-51.7). It further differs from *H. mesembrina* in having a smaller eye (diameter 11.3-13.8% HL vs. 13.1-17.9) and shorter posterior process on coracoid (reaching to midway of distance between bases of pectoral spine and first pelvic-fin ray vs. two thirds; its length 20.7-23.9% SL vs. 23.6-27.0), and from *H. spinulus* in having a longer dorsal spine (length 22.6-26.7% SL vs. 14.7-19.8), slenderer body (depth 12.5-14.5% SL vs. 17.2-20.9), narrower head (width 23.7-25.2% SL vs. 25.9-30.0), shorter posterior process on coracoid (reaching to midway of distance between bases of pectoral spine and first pelvic-fin ray vs. two thirds; length 20.7-23.9% SL vs. 24.9-28.0) and more vertebrae (33-35 vs. 30-32).

DESCRIPTION: Morphometric data in Table 6. Exactly as in *Hara filamentosa*, except for the following. Vertebrae 15+18=33 (2), 16+17=33 (1), 15+19=34 (2), 16+18=34 (3) or 16+19=35 (3). Dorsal fin with I,5,i (11) rays. Dorsal spine moderately long and gently curved; with smooth anterior margin and posterior margin with 6-8 serrae. Caudal fin with i,7,6,i (11) principal rays. First principal ray of upper caudal-fin lobe produced into a filament extending posteriorly for half length of upper caudal lobe proper. Anal fin with iv,6,i (10) or v,6,i (1) rays. Pelvic fin with i,5 (11) rays. Pectoral fin with I,6,i (11) rays; anterior spine margin with 18-19 small distally directed serrations, posterior margin with 13-14 large medially directed serrations. Coracoid with well developed posterior processes, extending to midway between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Colour: Head and body light chocolate brown, with a mottling caused by numerous smaller, irregular darker brown patches. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first chevron-shaped and located between dorsal- and adipose-fin bases, second thicker than first and located on caudal peduncle. Dorsal fin dark mottled brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes. Adipose fin brown as in body,

TABLE 6. Morphometric data for *Hara longissima* (n=11; 49.0-55.3 mm SL).

| | Holotype | Range | Mean±SD |
|---|----------|-----------|-----------|
| %SL | | | |
| Predorsal length | 46.1 | 42.7-46.5 | 44.8±1.52 |
| Preanal length | 67.8 | 63.2-69.4 | 68.1±1.73 |
| Prepelvic length | 50.4 | 48.1-51.2 | 49.6±0.96 |
| Prepectoral length | 23.0 | 20.1-24.9 | 22.1±1.29 |
| Length of dorsal fin base | 19.3 | 16.5-19.9 | 17.7±1.09 |
| Dorsal spine length | 25.8 | 22.6-26.7 | 24.7±1.37 |
| Anal fin length | 14.5 | 12.6-15.6 | 14.0±1.00 |
| Pelvic fin length | 16.6 | 16.4-21.8 | 17.9±1.67 |
| Pectoral fin length | 32.0 | 28.0-33.5 | 31.4±1.80 |
| Pectoral spine length | 29.5 | 25.9-31.8 | 29.2±1.80 |
| Caudal fin length | 20.7 | 18.8-27.4 | 23.6±2.72 |
| Length of adipose fin base | 15.4 | 13.3-16.5 | 14.8±0.93 |
| Dorsal to adipose distance | 11.1 | 9.0-12.5 | 10.9±1.28 |
| Post-adipose distance | 16.8 | 15.7-18.8 | 17.4±1.02 |
| Caudal peduncle length | 19.9 | 18.8-21.3 | 19.9±0.85 |
| Caudal peduncle depth | 5.9 | 5.0-6.1 | 5.7±0.38 |
| Body depth at anus | 13.7 | 12.5-14.5 | 13.4±0.60 |
| Head length | 28.3 | 26.0-29.1 | 27.9±0.89 |
| Head width | 25.2 | 23.7-25.2 | 24.6±0.47 |
| Head depth | 21.9 | 19.7-22.0 | 20.7±0.89 |
| Length of posterior process on coracoid | 22.9 | 20.7-23.9 | 22.3±0.97 |
| %HL | | | |
| Snout length | 53.1 | 48.4-60.3 | 54.9±3.52 |
| Interorbital distance | 36.6 | 32.9-38.3 | 36.0±1.34 |
| Eye diameter | 13.8 | 11.3-13.8 | 12.8±0.74 |
| Nasal barbel length | 24.8 | 13.8-30.7 | 21.0±5.56 |
| Maxillary barbel length | 84.1 | 77.4-99.3 | 90.5±7.37 |
| Inner mandibular barbel length | 41.4 | 40.7-50.3 | 44.5±3.10 |
| Outer mandibular barbel length | 57.9 | 53.5-72.3 | 59.8±6.04 |

with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Two small light brown patches present at bases of caudal-fin lobes in some individuals. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION: *Hara longissima* is known from the Irrawaddy River drainage in northern Myanmar (Fig. 2).

ETYMOLOGY: The name comes from the Latin *longissimus*, meaning longest, and refers to the relatively long caudal peduncle of this species. An adjective.

***Hara mesembrina* sp. nov.**

Fig. 7

HOLOTYPE: UMMZ 245903, 47.3 mm SL; Thailand: Ranong province, Baan Na district, hillstreams flowing from Langkatuek, Klong Naka; K. Udomrithiruj, April 2005.

PARATYPES: UMMZ 245602 (9), 31.4-55.3 mm SL; UMMZ 245963 (6), 42.4-55.8 mm SL; data as for holotype. CMK 12204 (3), 34.7-40.2 mm SL; Thailand: Ranong, stream N of Khura Bhuri, 100 km S of Ranong, 9°17'48"N 98°23'50"E; K. Kubota, March 1996.

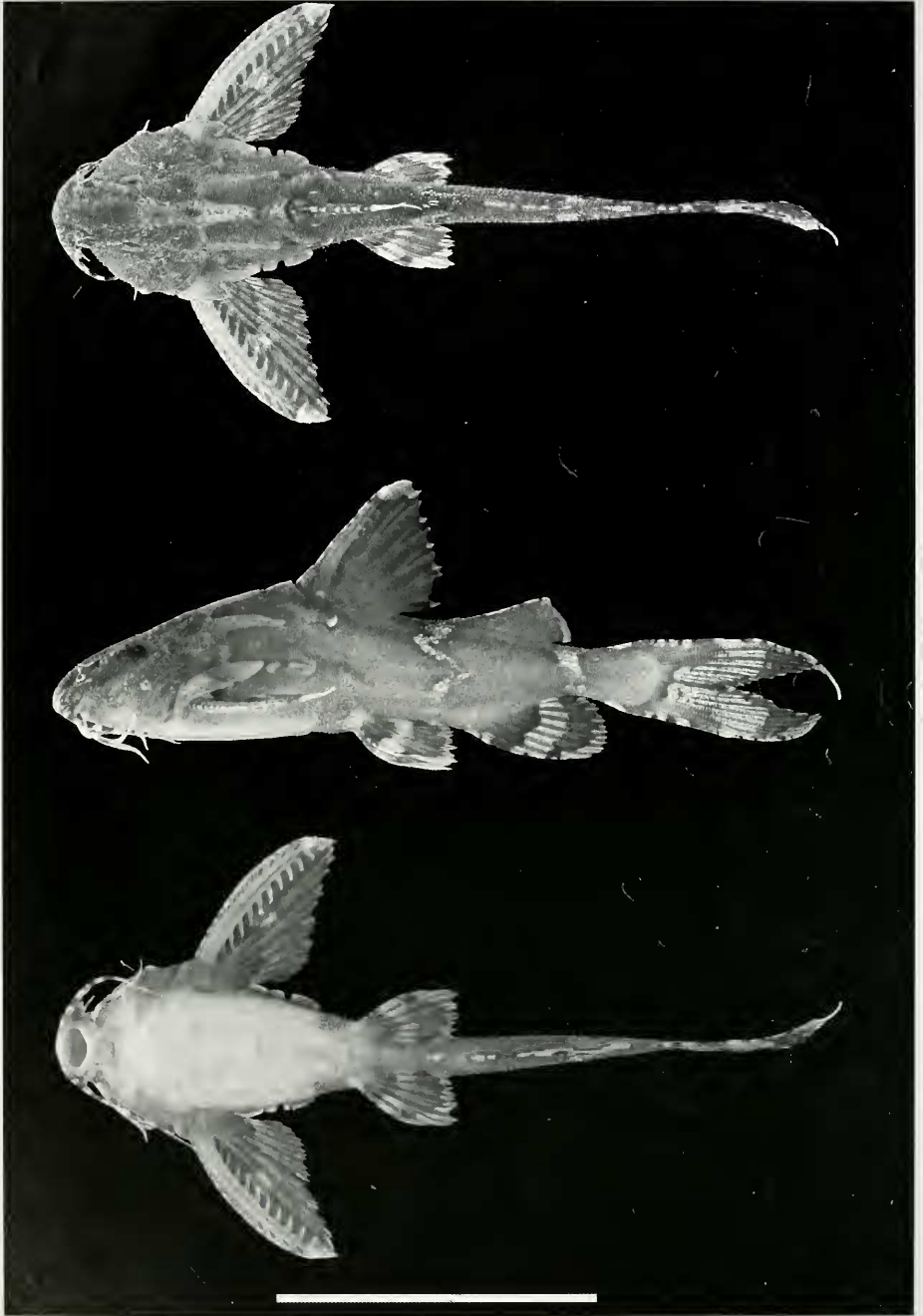


FIG. 7

Hara mesembrina, holotype, UMMZ 245903, 47.3 mm SL; Thailand: hillstreams flowing from Langkatuek. Scale bar: 25 mm.

DIAGNOSIS: *Hara mesembrina* can be distinguished from congeners except *H. filamentosa* and *H. longissima* in having (vs. lacking) a filamentous extension to the first principal ray of the upper caudal-fin lobe. It differs from *H. filamentosa* in having a longer posterior process on coracoid (reaching to two thirds of distance between bases of pectoral spine and first pelvic-fin ray vs. midway; length 23.6-27.0% SL vs. 19.9-22.8) and a longer caudal peduncle (length 17.2-18.9% SL vs. 14.9-17.8), and from *H. longissima* in having a shorter caudal peduncle (length 17.2-18.9% SL vs. 18.8-21.3), larger eye (diameter 13.1-17.9% HL vs. 11.3-13.8) and longer posterior process on coracoid (reaching to two thirds of distance between bases of pectoral spine and first pelvic-fin ray vs. midway; length 23.6-27.0% SL vs. 20.7-23.9). *Hara mesembrina* can be further distinguished from *H. hara* in having a deeper caudal peduncle (depth 6.0-7.4% SL vs. 5.0-5.8) and longer posterior process on coracoid (reaching to two thirds of distance between bases of pectoral spine and first pelvic-fin ray vs. midway; length 23.6-27.0% SL vs. 19.9-24.8), from *H. horai* in having a deeper caudal peduncle (depth 6.0-7.4% SL vs. 5.2-6.2), shorter head (length 22.1-27.3% SL vs. 30.3-34.2), longer adipose-fin base (length 13.5-17.0% SL vs. 10.0-13.7) and larger eye (diameter 13.1-17.9% HL vs. 8.0-9.8), and from both *H. jerdoni* and *H. minuscula* in having a shorter posterior process on coracoid (length 23.6-27.0% SL vs. 29.5-38.3), more soft pectoral-fin rays (total number of soft fin rays modally 6 vs. 5) and vertebrae (32-35 vs. 27-32) and the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate. It further differs from *H. jerdoni* in having a shorter pectoral spine (length 26.4-30.1% SL vs. 42.2-51.7), and from *H. spinulus* in having a longer dorsal spine (length 20.2-25.7% SL vs. 14.7-19.8) and caudal peduncle (length 17.2-18.9% SL vs. 11.8-15.0) and slenderer body (depth 13.1-16.7% SL vs. 17.2-20.9).

DESCRIPTION: Morphometric data in Table 7. Exactly as in *Hara filamentosa*, except for the following. Vertebrae 16+16=32 (1), 14+19=33 (1), 15+18=33 (7), 16+17=33 (2), 15+19=34 (3), 16+18=34 (4) or 16+19=35 (1). Dorsal fin with I,5,i (19) rays. Dorsal spine moderately long and gently curved; with smooth anterior margin and posterior margin with 4-9 serrae. Caudal fin with i,7,7,i (19) principal rays. First principal ray of upper caudal-fin lobe produced into a filament extending posteriorly for half length of upper caudal lobe proper. Anal fin with iii,6,i (5), iv,6 (3), iv,6,i (6), iii,7,i (2), iv,7 (2) or iv,7,i (1) rays. Pelvic fin with i,5 (19) rays. Pectoral fin with I,6,i (19) rays; anterior spine margin with 10-20 small distally directed serrations, posterior margin with 8-13 large medially directed serrations. Coracoid with well developed posterior process, extending to two thirds distance between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Colour: Head and body chestnut brown to light chocolate brown, with a mottling caused by numerous smaller, irregular darker brown patches. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first chevron-shaped and located between dorsal- and adipose-fin bases, second thicker than first and located on caudal peduncle. Dorsal fin dark mottled brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes.

TABLE 7. Morphometric data for *Hara mesembrina* (n=19: 31.4-55.8 mm SL).

| | Holotype | Range | Mean±SD |
|---|----------|-----------|-----------|
| %SL | | | |
| Predorsal length | 44.8 | 42.0-46.5 | 44.0±1.32 |
| Preanal length | 68.8 | 64.8-69.3 | 67.3±1.56 |
| Prepelvic length | 50.6 | 46.4-53.4 | 49.3±2.20 |
| Prepectoral length | 24.5 | 19.4-25.0 | 22.8±1.79 |
| Length of dorsal fin base | 19 | 17.4-20.2 | 18.6±0.99 |
| Dorsal spine length | 25.7 | 20.2-25.7 | 22.5±1.53 |
| Anal fin length | 15.3 | 14.0-17.2 | 15.3±1.19 |
| Pelvic fin length | 18.8 | 15.2-19.7 | 17.8±1.43 |
| Pectoral fin length | 32.6 | 28.4-33.3 | 31.1±1.56 |
| Pectoral spine length | 29.9 | 26.4-30.1 | 28.2±1.25 |
| Caudal fin length | 27.0 | 21.0-28.6 | 25.7±2.10 |
| Length of adipose fin base | 15.7 | 13.5-17.0 | 15.0±1.10 |
| Dorsal to adipose distance | 7.3 | 7.1-12.4 | 9.5±1.80 |
| Post-adipose distance | 16.7 | 15.0-19.3 | 16.8±1.32 |
| Caudal peduncle length | 18.8 | 17.2-18.9 | 18.3±0.56 |
| Caudal peduncle depth | 6.3 | 6.0-7.4 | 6.6±0.48 |
| Body depth at anus | 14.4 | 13.1-16.7 | 14.8±1.08 |
| Head length | 27.8 | 25.8-29.5 | 27.8±0.87 |
| Head width | 25.3 | 22.1-27.3 | 24.3±1.67 |
| Head depth | 20.7 | 18.7-23.5 | 21.6±1.41 |
| Length of posterior process on coracoid | 23.8 | 23.6-27.0 | 25.2±1.19 |
| %HL | | | |
| Snout length | 50.4 | 39.6-59.6 | 50.7±5.74 |
| Interorbital distance | 35.3 | 32.5-36.4 | 34.3±1.25 |
| Eye diameter | 13.5 | 13.1-17.9 | 14.6±1.48 |
| Nasal barbel length | 19.5 | 8.8-27.2 | 17.2±5.03 |
| Maxillary barbel length | 88.7 | 76.3-99.3 | 85.0±7.08 |
| Inner mandibular barbel length | 41.4 | 22.9-45.4 | 40.9±6.29 |
| Outer mandibular barbel length | 48.9 | 42.9-61.5 | 52.8±5.40 |

Adipose fin brown as in body, with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Two small light brown patches present at bases of caudal-fin lobes in some individuals. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION: *Hara mesembrina* is known from the small rivers draining the southern extremity of the Tenasserim Range (in the Isthmus of Kra in southern Thailand) that debouch into the Andaman Sea (Fig. 2).

ETYMOLOGY: The name comes from the Greek μεσημβρινός (mesembrinos), meaning southern, referring to the distribution of this species, which is the southern-most of all *Hara* species. An adjective.

***Hara minuscula* sp. nov.**

Fig. 8

HOLOTYPE: CAS 223734, 28.4 mm SL; Myanmar: Bago, Dayame Chaung, 1.6 km N of Daik-U; T. R. Roberts, 9 March 1985.

PARATYPES: CAS 61339 (45), 25.8-30.0 mm SL; data as for holotype. NRM 39883 (23), 25.0-31.0 mm SL; Myanmar: Bago, roadside stream about 64 km on road from Taungoo to

Nyaunglaybin, 18°19'5"N 96°30'7"E; F. Fang & A. Roos, 19 March 1997. UMMZ 245671 (1), 30.2 mm SL; Myanmar: from aquarium trade, collector and date unknown. ZRC 43576 (8), 23.3-29.3 mm SL; Myanmar: Bago; H. H. Tan, 28 February 1999.

DIAGNOSIS: *Hara minuscula* can be distinguished from congeners except *H. jerdoni* in having a longer posterior process on coracoid (reaching to three quarters of distance between bases of pectoral spine and first pelvic-fin ray vs. two thirds or less; length 29.5-32.9% SL vs. 19.9-28.0), fewer soft pectoral-fin rays (total number of soft fin rays modally 5 vs. 6-7) and the supraoccipital spine reaching (vs. not reaching) the anterior nuchal plate. It can be distinguished from *H. jerdoni* in having a shorter pectoral spine (length 28.6-34.7% SL vs. 42.2-51.7) and posterior process on coracoid (length 29.5-32.9% SL vs. 34.4-38.3) and more vertebrae (30-32 vs. 27-29). *Hara minuscula* can be further distinguished from *H. filamentosa* in having fewer vertebrae (30-32 vs 31-34), a longer pectoral spine (length 28.6-34.7% SL vs. 23.3-29.9) and always lacking (vs. sometimes with) a filamentous extension of the first principal ray of the upper caudal-fin lobe, from *H. hara* in having a wider head (width 24.5-27.2% SL vs. 22.4-24.3) and lacking (vs. having) serrations on the anterior edge of the pectoral spine, and from *H. horai* in having a shorter head (length 24.8-28.4% SL vs. 30.3-34.2). It further differs from *H. longissima* in having a shorter caudal peduncle (length 11.7-14.5% SL vs. 18.8-21.3), deeper body (depth 16.0-18.0% SL vs. 12.5-14.5), fewer vertebrae (30-32 vs. 33-34) and lacking (vs. having) a filamentous extension of the first principal ray of the upper caudal-fin lobe, from *H. mesembrina* in having a shorter caudal peduncle (length 11.7-14.5% SL vs. 17.2-18.9), deeper body (depth 16.0-18.0% SL vs. 13.1-16.7) and lacking (vs. having) a filamentous extension of the first principal ray of the upper caudal-fin lobe, and from *H. spinulus* in having a slenderer caudal peduncle (depth 4.1-7.0% SL vs. 6.7-8.5). *Hara minuscula* is also the smallest species of Indochinese *Hara*, with a maximum recorded size of ca. 30 mm SL (vs. ca. 55-67 mm SL in other Indochinese congeners); compared to Indian congeners, only *H. jerdoni* is smaller (Table 4).

DESCRIPTION: Morphometric data in Table 8. Exactly as in *Hara filamentosa*, except for the following. Vertebrae 15+15=30 (10), 16+14=30 (1), 15+16=31 (16), 16+15=31 (7) or 16+16=32 (2). Supraoccipital spine reaching anterior nuchal plate. Dorsal fin with I,5,i (36) rays. Dorsal spine moderately long and gently curved; with smooth anterior margin and posterior margin with 5-6 serrae. Caudal fin with i,7,7,i (36) principal rays; without filamentous extension to first principal ray of upper lobe. Anal fin with iii,6,i (14), iv,5,i (9) or iv,6,i (13) rays. Pelvic fin with with i,5 (36) rays. Pectoral fin with I,4,i (17) or I,5 (19) rays; anterior spine margin with 13-17 small distally directed serrations, posterior margin with 9-11 large medially directed serrations. Coracoid with well developed posterior process, extending to three quarters distance between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Colour: Head and body dark chestnut brown to light chocolate brown, with a mottling caused by numerous smaller, irregular darker brown patches. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first chevron-shaped and located between dorsal- and adipose-fin bases, second thicker than first and located on caudal peduncle. Dorsal fin dark mottled brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and

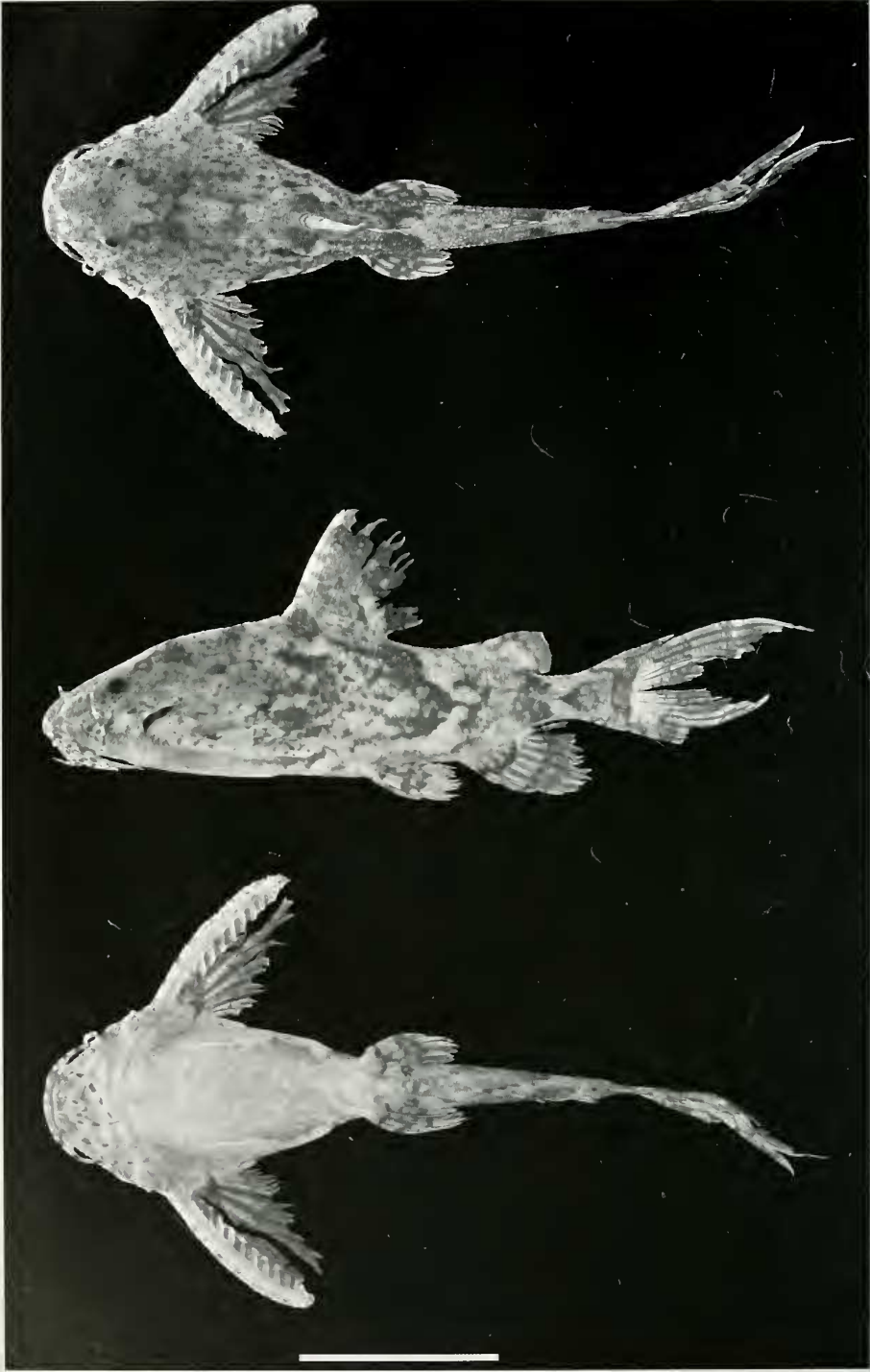


TABLE 8. Morphometric data for *Hara minuscula* (n=36: 25.8-31.0 mm SL).

| | Holotype | Range | Mean±SD |
|---|----------|------------|-----------|
| %SL | | | |
| Predorsal length | 44.9 | 42.9-46.7 | 44.7±1.26 |
| Preanal length | 71.6 | 68.8-75.1 | 72.3±1.74 |
| Prepelvic length | 56.1 | 52.2-56.1 | 54.2±1.30 |
| Prepectoral length | 20.0 | 17.9-22.2 | 20.4±1.32 |
| Length of dorsal fin base | 20.7 | 13.9-21.7 | 18.5±2.47 |
| Dorsal spine length | 20.0 | 18.7-22.9 | 21.2±1.29 |
| Anal fin length | 14.7 | 13.9-16.7 | 15.3±0.93 |
| Pelvic fin length | 17.5 | 13.8-19.7 | 17.4±1.63 |
| Pectoral fin length | 33.3 | 30.3-36.5 | 33.1±1.92 |
| Pectoral spine length | 32.6 | 28.6-34.7 | 31.3±1.68 |
| Caudal fin length | 34.7 | 27.0-35.9 | 32.2±2.87 |
| Length of adipose fin base | 15.4 | 12.9-18.4 | 15.5±1.48 |
| Dorsal to adipose distance | 8.4 | 8.4-11.6 | 9.7±1.07 |
| Post-adipose distance | 15.1 | 12.3-16.2 | 14.3±0.99 |
| Caudal peduncle length | 13.7 | 11.7-14.5 | 13.5±0.83 |
| Caudal peduncle depth | 6.7 | 4.1-7.0 | 5.5±0.92 |
| Body depth at anus | 16.5 | 16.0-18.0 | 17.0±0.66 |
| Head length | 28.1 | 24.8-28.4 | 26.8±1.02 |
| Head width | 26.3 | 24.5-27.2 | 25.6±0.79 |
| Head depth | 24.6 | 22.6-26.8 | 24.1±1.24 |
| Length of posterior process on coracoid | 32.6 | 29.5-32.9 | 31.3±1.13 |
| %HL | | | |
| Snout length | 50.0 | 45.5-54.5 | 50.9±2.40 |
| Interorbital distance | 41.3 | 37.0-42.9 | 40.0±1.80 |
| Eye diameter | 13.8 | 10.7-15.6 | 12.9±1.42 |
| Nasal barbel length | 21.3 | 17.3-32.5 | 22.8±4.71 |
| Maxillary barbel length | 92.5 | 74.0-100.0 | 86.5±7.38 |
| Inner mandibular barbel length | 47.5 | 40.0-57.1 | 50.1±5.41 |
| Outer mandibular barbel length | 73.8 | 58.2-73.8 | 65.0±4.43 |

either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes. Adipose fin brown as in body, with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Two small light brown patches present at bases of caudal fin lobes in some individuals. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION: *Hara minuscula* is known from the Sittang river drainage (Fig. 2).

ETYMOLOGY: The name comes from the Latin *minusculus*, meaning rather small, referring to the small size of this species. An adjective.

FIG. 8

Hara minuscula, CAS 223734, holotype, 28.4 mm SL; Myanmar: Dayame Chaung. Scale bar: 10 mm.

Hara spinulus sp. nov.

Fig. 9

HOLOTYPE: NRM 52556, 50.3 mm SL; Myanmar: Rakhine state, Baw Di Chaung at Baw Di bridge, 32 km from Gwa on road to Ngathaingchaung, 17°34'15"N 94°43'47"E; S. O. Kullander *et al.*, 18 March 1998.

PARATYPES: NRM 40750 (3), 34.7-48.5 mm SL; data as for holotype. UMMZ 246173 (1), 49.8 mm SL; Myanmar: Rakhine state, Thandwe Chaung; Than Kyaw Toe, November 2005.

DIAGNOSIS: *Hara spinulus* can be distinguished from congeners (except *H. minuscula*) in having a shorter dorsal spine (14.7-19.8% SL vs. 20.2-27.6). It can be further distinguished from *H. filamentosa* in having a shorter adipose-fin base (length 12.9-16.1% SL vs. 15.7-21.7) and caudal peduncle (length 11.8-15.0% SL vs. 14.9-17.8) and always lacking (vs. sometimes with) a filamentous extension of the first principal ray of the upper caudal-fin lobe, from *H. hara* in having a wider head (width 25.9-30.0% SL vs. 22.4-24.3), deeper caudal peduncle (depth 6.7-8.5% SL vs. 5.0-5.8) and lacking (vs. having) serrations on the anterior edge of the dorsal spine, and from *H. horai* in having a longer adipose-fin base (length 12.9-16.1% SL vs. 10.0-13.7), shorter (length 11.8-15.0% SL vs. 15.5-17.9) and deeper (depth 6.7-8.5% SL vs. 5.2-6.2) caudal peduncle, shorter head (length 26.9-28.9% SL vs. 30.3-34.2) and larger eye (diameter 11.2-14.4% SL vs. 8.0-9.8). *Hara spinulus* can be further distinguished from both *H. jerdoni* and *H. minuscula* in having a deeper caudal peduncle (depth 6.7-8.5% SL vs. 4.1-7.0), shorter posterior process on coracoid (reaching to two thirds of distance between bases of pectoral spine and first pelvic-fin ray vs. at least three quarters; length 24.9-28.0% SL vs. 29.5-38.3), more soft pectoral-fin rays (total number of soft fin rays modally 7 vs. 5) and the supraoccipital spine not reaching (vs. reaching) the anterior nuchal plate, from *H. jerdoni* in having a shorter pectoral spine (length 27.5-30.3% SL vs. 42.2-53.8) and caudal peduncle (length 11.8-15.0% SL vs. 15.1-18.4), more vertebrae (30-32 vs. 27-29), from *H. mesembrina* in having a shorter caudal peduncle (length 11.8-15.0% SL vs. 17.2-18.9), a deeper body (depth 17.2-20.9% SL vs. 13.1-16.7) and lacking (vs. having) a filamentous extension of the first principal ray of the upper caudal-fin lobe, and from *H. longissima* in having a deeper body (depth 17.2-20.9% SL vs. 12.5-14.5), wider head (width 25.9-30.0% SL vs. 23.7-25.2), longer posterior process on coracoid (reaching to two thirds of distance between bases of pectoral spine and first pelvic-fin ray vs. midway; length 24.9-28.0% SL vs. 20.7-23.9), fewer vertebrae (30-32 vs. 33-35) and lacking (vs. having) a filamentous extension of the first principal ray of the upper caudal-fin lobe.

DESCRIPTION: Morphometric data in Table 9. Exactly as in *Hara filamentosa*, except for the following. Vertebrae 15+15=30 (1), 15+16=31 (1), 15+17=32 (2) or 16+16=32 (1). Dorsal fin with I,5,i (1), I,6 (3) or I,6,i (1) rays. Dorsal spine moderately short and gently curved; with smooth anterior margin and posterior margin with 3-5 serrae. Caudal fin strongly forked, with i,7,7,i (2) or i,7,8,i (3) principal rays; without filamentous extension to first principal ray of upper lobe. Anal fin with iv,6,i (3), iv,7

FIG. 9

Hara spinulus, holotype, NRM 52556, 50.3 mm SL; Myanmar: Baw Di Chaung. Scale bar: 25 mm.

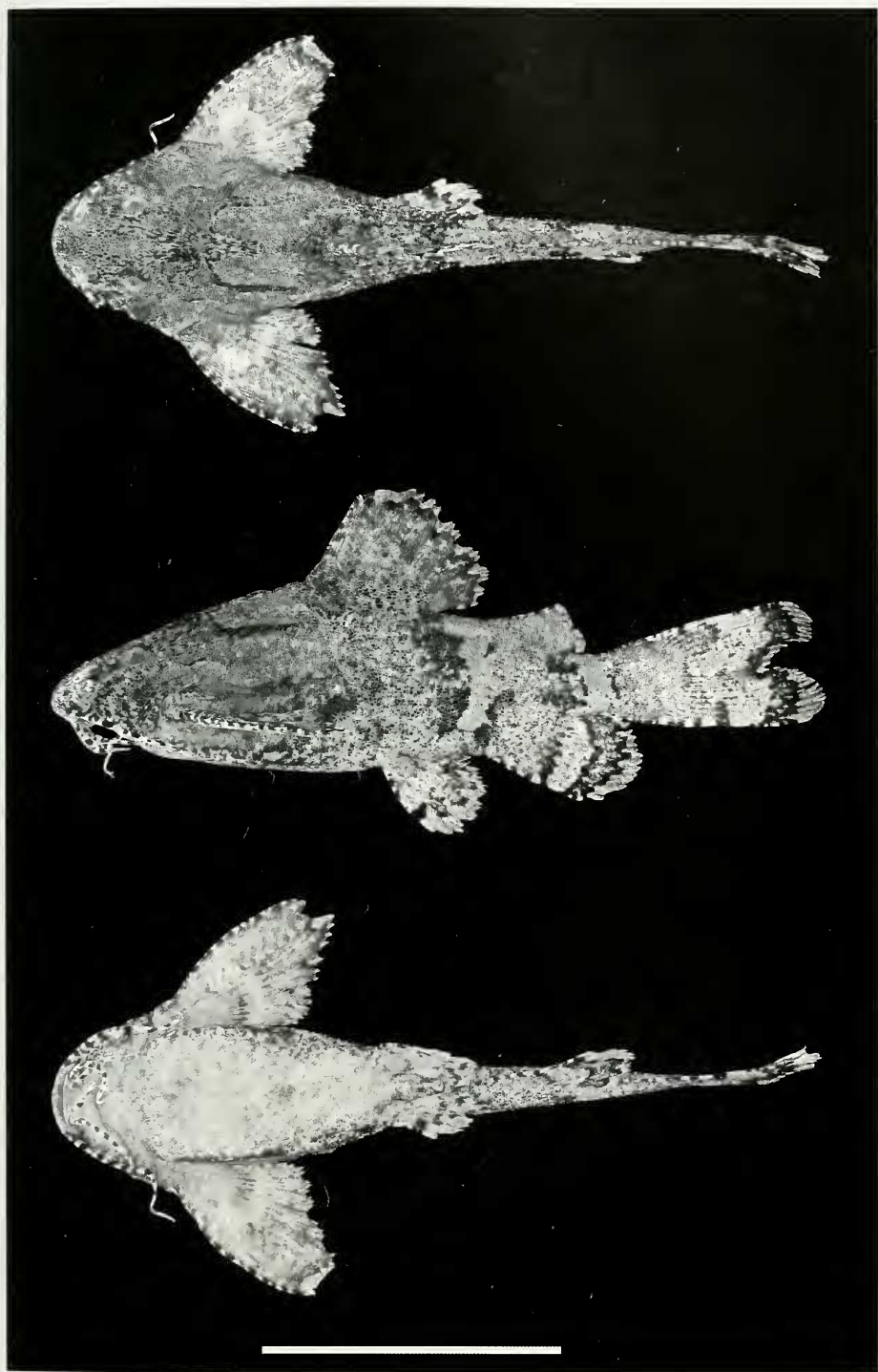


TABLE 9. Morphometric data for *Hara spinulus* (n=5: 34.7-50.3 mm SL).

| | Holotype | Range | Mean±SD |
|---|----------|------------|------------|
| %SL | | | |
| Predorsal length | 41.3 | 39.4-45.8 | 43.6±3.01 |
| Preanal length | 71.4 | 68.6-71.8 | 70.4±1.36 |
| Prepelvic length | 52.7 | 52.0-55.3 | 53.2±1.26 |
| Prepectoral length | 21.9 | 21.4-23.7 | 22.5±1.07 |
| Length of dorsal fin base | 21.9 | 19.1-22.9 | 20.7±1.67 |
| Dorsal spine length | 18.5 | 14.7-19.8 | 17.4±2.18 |
| Anal fin length | 16.9 | 15.3-18.3 | 16.5±1.26 |
| Pelvic fin length | 17.5 | 15.8-18.1 | 16.9±0.96 |
| Pectoral fin length | 30.6 | 29.3-33.3 | 31.0±1.47 |
| Pectoral spine length | 29.2 | 27.5-30.3 | 29.0±1.00 |
| Caudal fin length | 26.4 | 24.5-26.8 | 25.9±0.90 |
| Length of adipose fin base | 13.5 | 12.9-16.1 | 14.5±1.42 |
| Dorsal to adipose distance | 8.3 | 7.8-11.3 | 9.3±1.58 |
| Post-adipose distance | 14.7 | 12.4-17.7 | 14.9±1.89 |
| Caudal peduncle length | 12.9 | 11.8-15.0 | 13.8±1.40 |
| Caudal peduncle depth | 8.5 | 6.7-8.5 | 7.4±0.66 |
| Body depth at anus | 20.9 | 17.2-20.9 | 18.5±1.51 |
| Head length | 28.8 | 26.9-28.9 | 28.2±0.80 |
| Head width | 29.0 | 25.9-30.0 | 28.6±1.69 |
| Head depth | 23.7 | 22.7-24.7 | 23.7±0.86 |
| Length of posterior process on coracoid | 27.6 | 24.9-28.0 | 26.5±1.31 |
| %HL | | | |
| Snout length | 50.3 | 47.4-52.9 | 50.4±2.04 |
| Interorbital distance | 33.6 | 33.6-37.3 | 35.7±1.71 |
| Eye diameter | 11.6 | 11.2-14.4 | 12.4±1.25 |
| Nasal barbel length | 32.9 | 22.1-32.9 | 27.1±4.14 |
| Maxillary barbel length | 85.6 | 72.5-104.5 | 91.3±13.01 |
| Inner mandibular barbel length | 52.7 | 43.1-53.7 | 49.0±4.40 |
| Outer mandibular barbel length | 61.6 | 56.9-68.7 | 61.3±4.49 |

(1) or iv,7,i (1) rays. Pelvic fin with i,5 (4) rays. Pectoral fin with I,6 (1) or I,6,i (4) rays; anterior spine margin with 11-18 small distally directed serrations, posterior margin with 7-11 large medially directed serrations. Coracoid with well developed posterior processes, extending to two thirds distance between base of posteriormost pectoral-fin ray and pelvic-fin origin.

Colour: Head and body terracotta to light chocolate brown, with a mottling caused by numerous smaller, irregular darker brown patches. Belly and ventral surfaces of head light brown. Two thin, irregular light brown bars on body: first located between dorsal- and adipose-fin bases, second thicker than first and located on caudal peduncle. Dorsal fin dark mottled brown, except for thin hyaline distal margin. Pectoral fin dark brown, with thin hyaline distal margin and either a small ovoid hyaline spot or a crescentic median hyaline band on middle third of fin. Pelvic and anal fins hyaline, with dark brown bases and subdistal stripes. Adipose fin brown as in body, with lighter coloured distal margin. Caudal fin hyaline, with irregular W-shaped band subdistally and with small dark brown flecks randomly distributed throughout fin. Two small light brown patches present at bases of caudal-fin lobes in some individuals. Maxillary and mandibular barbels light brown, with dark brown annuli.

DISTRIBUTION: *Hara spinulus* is known from the Baw Di Chaung drainage, which drains the western face of the Rakhine (Arakan) Yoma, in southwestern Myanmar (Fig. 2).

ETYMOLOGY: The name comes from the diminutive form of the Latin *spina*, meaning thorn, and refers to the short dorsal spine of this species. A noun in apposition.

KEY TO THE SPECIES OF *HARA*

- 1 Caudal fin emarginate; vertebrae 27-29 [Brahmaputra and Ganges river drainages] *H. jerdoni*
Caudal fin deeply forked; vertebrae 30-35 2
- 2 Serrations on anterior edge of dorsal spine present [Ganges and Brahmaputra river drainages] *H. hara*
Serrations on anterior edge of dorsal spine absent 3
- 3 Supraoccipital process reaching anterior nuchal plate; posterior process on coracoid extending three quarters distance between bases of pectoral spine and pelvic fins; total soft pectoral-fin rays modally 5 [Sittang River drainage] *H. minuscula*
Supraoccipital process not reaching anterior nuchal plate; posterior process on coracoid extending two thirds or less distance between bases of pectoral spine and pelvic fins; total soft pectoral-fin rays modally 6-7 4
- 4 Length of adipose-fin base 10.0-13.7% SL; eye diameter 8.0-9.8% HL [Brahmaputra River drainage] *H. horai*
Length of adipose-fin base 12.9-17.0% SL; eye diameter 11.2-17.9% HL 5
- 5 Length of dorsal spine 14.7-19.8% SL; first principal ray on upper lobe of caudal fin not extended into filament [Baw Di Chaung drainage] *H. spinulus*
Length of dorsal spine 20.2-27.6% SL; first principal ray on upper lobe of caudal fin usually extended into filament 6
- 6 Posterior process on coracoid reaching to two thirds distance between bases of pectoral spine and first pelvic-fin ray, its length 23.6-27.0% SL [rivers draining southern extremity of Tenasserim Range] *H. mesembrina*
Posterior process on coracoid reaching to midway of distance between bases of pectoral spine and first pelvic-fin ray, its length 19.9-23.9% SL 7
- 7 Caudal peduncle length 14.9-17.8% SL, depth 6.1-7.2% SL (depth 2.1-2.9 times in its length); body depth 13.9-19.2% SL [Ataran, Salween and Sittang river drainages] *H. filamentosa*
Caudal peduncle length 18.8-21.3% SL, depth 5.0-6.1% SL (depth 3.1-3.9 times in its length); body depth 12.5-14.5% SL [Irrawaddy River drainage] *H. longissima*

DISCUSSION

Although Thomson & Page (2006) consider *Erethistes* and *Hara* to be synonyms (the former being the senior name), a phylogenetic analysis of the Sisoridae using 190 morphological and 1371 molecular characters carried out as part of HHN's

doctoral dissertation (Ng, 2006) indicates that *Hara* (including *Erethistes*) is paraphyletic. The analysis of the concatenated dataset indicates that the species currently assigned to *Hara* can be divided into three clades: one consisting of *H. filamentosa* (the type species of *Hara*)+*H. mesembrina*, another consisting of *H. jerdoni*+*H. minuscula*, and another consisting of *Erethistes pusillus* and all other species of *Hara*. However, the three clades were not recovered in the analysis of the morphological dataset alone (most species of *Hara* were recovered in a polytomy with *Erethistoides* and *Ayarnangra*) and no morphological synapomorphies could be found to diagnose the three clades. The apparent paraphyly of *Hara* and the conflicting nature of the evidence are currently being further investigated and the complete results of the analysis will be published elsewhere. The synonymization of *Hara* with *Erethistes* by Thomson & Page (2006) does not truly reflect the phylogenetic relationships of this group of catfishes. Therefore, pending publication of the results of a fine-scale phylogenetic analysis of the group, we follow the sole current usage in the literature in recognizing *Erethistes* and *Hara* as distinct genera. We see no advantage in substituting one non-phylogenetic classification scheme with another.

The species-level taxonomy of *Hara* was confused, with only one attempt to review the genus (Hora, 1950). We consider only three valid species to occur on the Indian subcontinent: *H. hara* (Hamilton, 1822), *H. horai* Misra, 1976 and *H. jerdoni* Day, 1870. Both *H. sahasrai* Datta Munshi & Srivastava, 1988 and *H. serrata* Vishwanath & Kosygin, 2000 are considered junior synonyms of *H. hara* because we could not find any significant differences in comparing the original descriptions and material we identified as *H. hara*. *Hara sahasrai* (described from the Ganges River drainage in northern Bihar, which is within the recorded range for *H. hara*) is not adequately diagnosed from *H. hara* in the original description. The only difference is mentioned in the key to the species (Datta Munshi & Srivastava, 1988: 263), and states that *H. hara* has a pectoral spine shorter than head length, while *H. sahasrai* has a pectoral spine longer than head length. Our examination of material indicates that the pectoral spine in *H. hara* is equal to, or very slightly longer than head length and because we could not find other characters to distinguish between the two species, we consider them to be conspecific. *Hara serrata* (described from the Jiri River, a tributary of the Barak River, itself a tributary of the Brahmaputra River, which is within the recorded range for *H. hara*) is diagnosed as a distinct species based on the serrated anterior edge of the dorsal spine, but our examination of *H. hara* shows that it also has the dorsal spine serrated anteriorly. No other characters could be found to distinguish *H. serrata* and *H. hara*, and we also consider the two conspecific here.

Hara filamentosa was originally described from the Tenasserim Provinces, which was a British administrative unit of colonial Burma (Myanmar) consisting of the coastal area east and south of the Irrawaddy Delta [not to be confused with the present administrative unit of Tanintharyi (Tenasserim), which constitutes only a fraction of the former Tenasserim Provinces]. The Tenasserim Provinces include the present-day states of Kayah, Kayin, Mon, Bago (partially) and possibly Tanintharyi in Myanmar (Fang & Kottelat, 1999). We have discussed the actual locality of the fishes described from "Tenasserim" by Blyth in an earlier work (Ng & Kottelat, 2001), and hypothesize that much of this material comes from either the Sittang River drainage or from the

drainages to the south of it. The original description does not state on how many specimens it is based and Blyth gives only one size (3 inches) which could mean either that he examined a single specimen (which would then be the holotype) or several for which only the size of the largest is given, a common practice of the time. Edward Blyth was the curator of the museum of the Asiatic Society of Bengal, and types of the fishes he described were initially deposited at the Society's museum; this material was subsequently transferred to the Indian Museum (now the Zoological Survey of India (Whitehead & Talwar, 1976).

Hora (1950) examined six specimens of *Hara* (ZSI 585) in the ZSI collected by Berdmore from "Tenasserim" (Major Hugh Berdmore [May 1812-30 May 1859] collected in Tenasserim the type series of several species described by Blyth). As the description of *H. filamentosa* appeared after Berdmore's death (apparently in U.K.) it seems that part (or all) of ZSI 585 could have been used in the original description of *H. filamentosa*. Hora (1950) reidentified five of the six specimens as *H. filamentosa* (which he considered conspecific with *H. hara*), and the remaining specimen as *Erethistes pusillus*. Other than the size of the specimen reidentified as *E. pusillus* (39.8 mm SL, which is smaller than the the size reported by Blyth; possibly the size of his largest specimens if he had more than one), no other indication of size was given by Hora (1950) for ZSI 585. Hora (1950: 201) commented that "it appears ... that Day's [1877: pl. 102 fig. 4] figures of *E. conta* ... were made from one of these specimens [ZSI 585]". Day (p. 453) commented that "Berdmore sent 5 or 6 specimens to the Calcutta Museum". This creates some doubts as to whether all of the specimens in ZSI 585 may indeed be the type(s) of *H. filamentosa*.

We note that the specimen out of ZSI 585 that Hora identified as *E. pusillus* is the only specimen of the species ever recorded from Myanmar and this casts doubts as to its identity or origin. *Erethistes pusillus* is otherwise known only from the Brahmaputra and Ganges river drainages. Since the drawing of the pectoral spine of this specimen in Hora (1950: fig. 1) is unmistakably that of *E. pusillus*, this means that the material in ZSI 585 almost certainly was obtained from at least two different areas (southern Myanmar and somewhere in the Ganges or Brahmaputra river drainage). This has implications for the stability of nomenclature (see below).

The first author visited the ZSI twice, but was neither able to examine ZSI 585 nor successfully locate the type material of *H. filamentosa*. This type material is also not mentioned in the catalogue of fish types in that collection (Menon & Yazdani, 1968). The fish collections of the ZSI suffered extensive loss and damage as a result of a flood when the collection was temporarily housed in Benares during the Second World War (Chopra, 1947; Whitehead & Talwar, 1976), and the type(s) of *H. filamentosa* might have been lost at that time or is(are) mislabelled or misplaced. It is not known if Hora examined ZSI 585 before or after the war. There is no known other material that could possibly be types of *H. filamentosa*. Our studies indicate that several species of *Hara* with a filamentous extension of the dorsalmost principal caudal-fin ray occur in Myanmar and Thailand; only one is known from southern Myanmar (in the former "Tenasserim Provinces") to date, and we identify it as *H. filamentosa*. However, problems remain in objectively defining *H. filamentosa* with the uncertainties surrounding the type series, the number of types originally included, the possible type

status and apparent loss of ZSI 585, and the vague type locality. As two species are recorded by Hora in the potential type series, the status of the name can only be cleared by a lectotype or a neotype designation.

The designation of a neotype is needed to define the nominal taxon objectively. We designate MHNG 2687.038, 43.7 mm SL, from the Ataran drainage in Myanmar, as neotype of *H. filamentosa*, as diagnosed and described above. It agrees with Blyth's original description, with Day's drawing of a putative syntype, and it comes from within the area that can be considered as the original type locality.

Kottelat (1983) described *Erethistes maesotensis* from the Salween River drainage in western Thailand. The only difference between *Erethistes* and *Hara* is the direction of the serrations on the anterior edge of the pectoral spine (divergent in *Erethistes* and antrorse in *Hara*; Hora, 1950, de Pinna, 1996). The serrations in the pectoral spine of *E. maesotensis* (Kottelat, 1983: fig. 2b) are not truly divergent, but have a few that are retrorse or anteriorly directed, instead of all the serrations being antrorse as typically seen in other *Hara* species. This is a condition commonly seen in juvenile *Hara*, and as such, we attach no significance to its use as a diagnostic character. We were unable to find any significant differences between the material of *H. filamentosa* from the Salween River drainage in western Thailand (most collected at or very near the type locality of *E. maesotensis*) with the material we identify as *H. filamentosa* from Myanmar, although it should be noted that most of the Salween material we have examined (58 out of 65 specimens) lack the filamentous extension to the dorsalmost principal caudal-fin ray.

Of the other material from Myanmar reported as *H. hara* by Hora (1950), the material from Meetan [=Mitan Chaung] (ZSI F11049/1) is most likely *H. filamentosa*, while that from Indawgyi Lake (ZSI F10878/1) and Mandalay (ZSI 582) is most likely *H. longissima* (the probable identities of these three lots are surmised from the collection localities). The specimen reported from Bassein (ZSI 1453) is almost certainly *H. minuscula*, as this specimen was reported as having a proportionately longer pectoral spine (a relatively long pectoral spine is a diagnostic character of this species).

Because *H. filamentosa* and *H. minuscula* occur sympatrically in the Sittang river drainage, it is necessary to rule out the possibility that the smaller *H. minuscula* are not merely juvenile *H. filamentosa*. The most striking difference is the extent of the supraoccipital process; it reaches the anterior nuchal plate in *H. minuscula* while it does not reach it in *H. filamentosa*. We note that the contact between the supraoccipital process and the anterior nuchal plate is independent of ontogeny, as it remains constant for all *Hara* species (from India, Bangladesh, Thailand and Myanmar) of all size ranges we have examined (16-85 mm SL; see individual species account for explicit details of size ranges of each species).

The number of vertebrae also distinguishes the two species (Table 10). While the number of abdominal vertebrae does not really distinguish *Hara* species, *H. minuscula* differs from *H. filamentosa* by the number of caudal vertebrae (14-16, vs. 17-19) and the total number of vertebrae (30-32, vs. 31-34). *Hara minuscula* is distinguished from all other Indochinese *Hara* species in having most specimens (29 out of 36) with more abdominal vertebrae than caudal or equal number of both; caudal vertebrae outnumber abdominal vertebrae in only 7 specimens out of 36 examined (Table 10). In *H. filamentosa* there are 2 to 5 more caudal than abdominal vertebrae.

Hara minuscula possesses fewer soft pectoral fin rays (modally 5 vs. 6-7) than most congeners. This reduction also occurs only in *H. jerdoni*, another diminutive *Hara* species, and we treat this reduction as a pedomorphic character associated with miniaturization (see discussion in Weitzman & Vari, 1988).

The original description of *H. horai* Misra (1976: 245, pl. 9 fig. 1) does not include explicit information on type material and Tilak & Talwar (1976: 246) designated a neotype. This neotype designation is not valid because a neotype can only be designated if all primary types (holotype, lectotype, neotype or syntypes) are lost (ICZN art. 75.3). Tilak & Talwar assumed that there was a holotype and that it is lost. This is erroneous because Misra did not state that he had a single specimen. All specimens on which Misra's *H. horai* is based are syntypes. These syntypes include all specimens examined by Misra [if any] and the specimens of *H. hara* sensu Hora (1950: 200) explicitly listed by Misra as belonging to the present species, that is those collected by Shaw & Shebbeare in Terai and Duars; Hora (1950: 201) listed only ZSI F11390/1 [2]; so there are at least 2 syntypes and one of them is still extant (the one Tilak & Talwar designated as neotype). Therefore, the Code does not permit the designation of a neotype. This surviving syntype is designated here as lectotype of *H. horai*.

The length of the posterior process on coracoid is a useful diagnostic character for *Hara* species. Its use in diagnosing members of the Erethistidae is reported here for the first time, although it has previously been shown to be useful in diagnosing species of the Aspredinidae, another siluriform group with a prominent posterior process on the coracoid (Mees, 1989).

ACKNOWLEDGEMENTS

We thank James Maclaine (BMNH), David Catania (CAS), Sonia Fisch-Muller, Claude Weber (MHNG), Sven Kullander (NRM), Douglas Nelson (UMMZ), Kelvin Lim (ZRC) and A. K. Karmakar (ZSI) for permission to examine material under their care. Thanks are also due to Katsuma Kubota for assistance in the field and gift of material, Kamphol Udomritthiruj and U Tin Win for providing material for study, and an anonymous reviewer for useful comments. Funding from the Horace H. Rackham School of Graduate Studies, University of Michigan to HHN is gratefully acknowledged.

REFERENCES

- BLYTH, E. 1860. Report on some fishes received chiefly from the Sitang River and its tributary streams, Tenasserim Provinces. *Journal of the Asiatic Society of Bengal* 29: 138-174.
- CHOPRA, B. 1947. Zoological Survey of India, 1942-1945. *Records of the Indian Museum* 44: 347-355.
- DATTA MUNSHI, J. S. & SRIVASTAVA, M. P. 1988. Natural history of fishes and systematics of freshwater fishes of India. *Narendra Publishing House, Delhi*, 403 pp.
- DAY, F. 1870. Notes on the genus *Hara*. *Journal of the Asiatic Society of Bengal* 39: 37-40.
- DAY, F. 1875-78. The fishes of India; being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma, and Ceylon. *Quaritsch, London*, (1875): 1-168, pls 1-40; (1876): 169-368, pls 41-78; (1877): 369-552, pls 79-138; (1878): i-xx, 553-778, pls 139-195.

- DE PINNA, M. C. C. 1996. A phylogenetic analysis of the Asian catfish families Sisoridae, Akysidae, and Amblycipitidae, with a hypothesis on the relationships of the neotropical Aspredinidae (Teleostei, Ostariophysi). *Feldiana. Zoology (New Series)* 84: 1-83.
- FANG, F. & KOTTELAT, M. 1999. *Danio* species from northern Laos, with descriptions of three new species (Teleostei: Cyprinidae). *Ichthyological Exploration of Freshwaters* 10: 281-295.
- HORA, S. L. 1950. Siluroid fishes of India, Burma and Ceylon. XIII. Fishes of the genera *Erethistes* Müller and Troschel, *Hara* Blyth and of two new allied genera. *Records of the Indian Museum* 47: 183-202.
- HUSAIN, A. & TILAK, R. 1978. On the redescription and distribution of *Hara jerdoni* Day (Sisoridae: Siluriformes). *Journal of the Inland Fisheries Society of India* 9: 92-97.
- KOTTELAT, M. 1983. A new species of *Erethistes* Müller & Troschel from Thailand and Burma (Osteichthyes: Siluriformes: Sisoridae). *Hydrobiologia* 107: 71-74.
- KOTTELAT, M. 1989. Zoogeography of fishes from Indochinese inland waters with an annotated check-list. *Bulletin Zoölogisch Museum Universiteit van Amsterdam* 12: 1-55.
- M'CLELLAND, J. 1844. Description of a collection of fishes made at Chusan and Ningpo in China, by Dr. G. R. Playfair, Surgeon of the Phlegethon, War Steamer, during the late Military operations in that country. *Calcutta Journal of Natural History, Miscellaneous Arts and Sciences in India* 4: 390-413, pls 21-25.
- MEES, G. F. 1989. Notes on the genus *Dysichthys*, subfamily Bunocephalidae, family Aspredinidae (Pisces, Nematognathi). *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen (Series C. Biological and Medical Sciences)* 92: 189-250.
- MENON, A. G. K. & YAZDANI, G. M. 1968. Catalogue of type-specimens in the Zoological Survey of India, Part 2. Fishes. *Records of the Zoological Survey of India* 61: 91-190.
- MISRA, K. S. 1976. The fauna of India and adjacent countries. Pisces. Vol. III. Teleostomi: Sypriniformes: Siluri. *Zoological Survey of India, Calcutta*, 367 pp.
- NG, H. H. 2006. A Phylogenetic Analysis of the Asian Catfish Family Sisoridae (Teleostei: Siluriformes), and the Evolution of Epidermal Characters in the Group. PhD dissertation, University of Michigan, Ann Arbor, 448 pp.
- NG, H. H. & KOTTELAT, M. 1998. *Hyalobagrus*, a new genus of miniature bagrid catfish from Southeast Asia (Teleostei: Siluriformes). *Ichthyological Exploration of Freshwaters* 9: 335-346.
- NG, H. H. & KOTTELAT, M. 2001. A review of the genus *Batasio* (Teleostei: Bagridae) in Indochina, with the description of *B. tigrinus* n. sp. from Thailand. *Revue suisse de Zoologie* 108: 495-511.
- ROBERTS, T. R. 1994. Systematic revision of Asian bagrid catfishes of the genus *Mystus* sensu stricto, with a new species from Thailand and Cambodia. *Ichthyological Exploration of Freshwaters* 5: 241-256.
- THOMSON, A. W. & PAGE, L. M. 2006. Genera of the Asian Catfish Families Sisoridae and Erethistidae (Teleostei: Siluriformes). *Zootaxa* 1345: 1-96.
- TILAK, R. & TALWAR, P. K. 1976. A taxonomic reassessment of *Hara horai* Misra (Pisces: Sisoridae) with a designation of neotype. *Newsletter of the Zoological Survey of India* 2: 245-247.
- UKKATAWEWAT, S. & VIDTHAYANON, C. 1998. [Fishes of the Salween River basin, Thailand]. *Aquatic Natural Resources Museum, Technical Paper* 2: 1-89 [Thai, English abstract].
- VINCIGUERRA, D. 1890. Viaggio di Leonardo Fea in Birmania e regioni vicine XXIV. Pesci. *Annali del Museo Civico di Storia Naturale di Genova (Serie 2a)* 9: 129-362.
- VISHWANATH, W. & KOSYGIN, L. 2000. On a new species of the genus *Hara* Blyth from Manipur, India. *Indian Journal of Fisheries* 47: 143-147.
- WEITZMAN, S. H. & VARI, R. P. 1988. Miniaturization in South American freshwater fishes: an overview and discussion. *Proceedings of the Biological Society of Washington* 101: 444-465.
- WHITEHEAD, P. J. P. & TALWAR, P. K. 1976. Francis Day (1829-1889) and his collection of Indian fishes. *Bulletin of the British Museum (Natural History) Historical Series* 5: 1-189.